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DEVELOPMENT OF FLIGHT-BY-FLIGHT FATIGUE TEST DATA FROM STATISTICAL DISTRIBUTIONS OF AIRCRAFT STRESS DATA

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NOTICE

This technical report has been reviewed and is approved for publication.

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Axially loaded specimens of 7075-T651 aluminum with a hole ($K_t = 2.54$) were fatigue tested using loading histories derived from strain gage data recorded on operational aircraft.

For the baseline data the magnitude and order in which the loads occurred during a flight were preserved. The flight contained data from taxi, take-off, flight and landing strain histories.

The data was then processed by several counting techniques to obtain statistical distributions of the cyclic and mean stress amplitudes, as well as the number of stress cycles per flight for both the ground operations and the in-flight operations. These distributions were then used to generate a series of flight-by-flight test sequences. The sequences were obtained by randomly selecting from the distributions a ground mean, the number of cyclic stresses, and the magnitude of the cyclic stress for each stress cycle of the taxi and ground operations. The process was repeated for the flight operation. These sequences were used to program the closed-loop fatigue machines. Thousands of unique flights with hundred of thousands of stress cycles were generated.

Three different counting techniques were used to determine the statistical distribution of the cyclic stress for each of two aircraft types. Tests were also conducted wherein the cyclic stresses during operations on the ground were omitted, however, a distribution of preflight ground stresses were used as the starting point for each flight.

The report presents the results in terms of the number of flights to failure for 9 sequences of B-58 data and 6 sequences for the F-106 data. A total of 91 specimens were tested. The report concludes that simulated testing sequences can yield the same fatigue life as the original strain gage data recorded on operational aircraft.

FOREWORD

The efforts reported herein were performed by the Aerospace Mechanics Division of the University of Dayton Research Institute, Dayton, Ohio, under Air Force Contract F33615-73-C-3007, Project 1367, Task No. 0313. The program was sponsored by the Air Force Flight Dynamics Laboratory, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.

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The work reported herein was performed during the period October 1972 to September 1974. The draft of this technical report was submitted by the authors in January 1975.

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SECTION 1

INTRODUCTION

The introduction of closed-loop electrohydraulic fatigue machines in the last few years has made it practical to perform fatigue testing without restrictions on the order of loading or the number of consecutive load cycles of one amplitude. In fact, complete flight-by-flight load simulations are possible.

Schijve in Reference 1 presents a rather complete discussion on the subject of aircraft structure fatigue. The discussion covers the physical and empirical limitations associated with using a linear damage theory and supporting data for life assessment problems involving a variable amplitude load sequence. He noted that flight simulation testing was essential for accurate assessment of fatigue life and crack propagation rate.

The present effort is concerned with establishing methodology for developing simulation sequences. The approach taken included the development of strain based sequences from strain gage data recorded during bomber and fighter aircraft flight operations. During the development of these sequences, the strain gage data were edited to remove small cycles (less than 3800 psi peak to peak) and inactive portions of the flight, but the order in which the remaining peaks occurred during a flight was preserved. The stress magnitudes were expressed in terms of stress relative to zero, in the same manner as the data were recorded, so that there was no requirement to identify the mean and alternating parts of the cycles for these sequences.

The strain gage data was also reduced to obtain statistical data on parameters considered necessary to describe the intensity of the flight-by-flight data. Statistical distributions were obtained for preflight stress, ground and flight 1-g stresses, stress cycles per ground operation, stress

cycles per flight, flight and ground peak stresses. Different counting techniques were used to obtain three sets of distributions of peak stresses resulting from gust, maneuver and taxi induced loadings. These data were used to develop simulated flight-by-flight sequences. It should be noted that G. M. vanDijk in Reference 2 presents several methods whereby one can process flight loads data to obtain statistical parameters that can be used to generate simulated flight data.

The strain based and simulated sequences were applied to coupon specimens, and the resulting fatigue lives compared. Techniques were selected as a result of these comparisons for simulating bomber and fighter aircraft operational load histories. Additional strain based and simulation sequences were developed from alternate bomber and fighter strain gage data as a means of demonstrating the general applicability of the selected simulation techniques for a range of operational flight load intensities.

Volume I of this report provides a description of the data and procedures used to develop the flight-by-flight sequences, the experimental program and a discussion of the results. Volume II provides a description of the computer programs used in generating the simulation sequences.

SECTION 2

RECORDED DATA

2.1 B-58 DATA

The University of Dayton during the period 1965 to 1969 had frequency modulated (FM) magnetic tape recorders installed on 4 of the USAF B-58 bomber aircraft. These recorders were used to collect flight loads data from the aircraft as they were used in the normal operating manner.

The recording program collected time history data on airspeed, altitude, center-of-gravity acceleration, and eight strain gage locations. Several of the strain gage locations were duplicated on the left and right side of the aircraft. For the present effort the strain gage located on the lower side of the spar at wing station 438.3 and span station 56.5 was chosen for the source of data. The stress at this location is sensitive to wing bending loading and is negative when the aircraft is on the ground and is positive when the aircraft is in flight. The time-history strain gage data was processed in terms of stress relative to zero stress using a calibrated value of preflight stress, which varies as a function of the aircraft gross weight, as the initial stress value when the aircraft is parked on the ground. All B-58 flights were designated as operational training flights. The mission profiles included the normal mission segments of taxi, take-off, ascent, cruise, descent, and landing as well as special mission segments of supersonic dash, refueling, and low level. The low level mission segments included flights over specified low level courses at constant pressure altitudes and at fixed altitudes above the terrain.

It was decided, based on the mean stress level and the K_T of the test specimen, that the B-58 data could be truncated so that minimum range between one reversal and the next could be 3800 psi. The flight recordings were then processed such that the peak stress of any cycle and the minimum

stress of the cycle were written on digital tape. The position of a switch on the landing gear also was used to identify whether the stress peak occurred when the aircraft was on the ground or in-flight. As each flight was processed the statistical variance of the stress peaks and valleys was calculated by the equation:

$$\text{Stress Variance} = \frac{N\sum_{i=1}^{N} S_i^{\,2} - \left(\sum_{i=1}^{N} S_i\right)^2}{N(N-1)} \tag{1}$$

where S is the value of the stress for a peak or valley.

One of the objectives of the project was to investigate the effect that a mild or severe load history might have on the accuracy of a simulation technique; therefore the flights were divided into two sets: a low intensity set and a high intensity set. The variance was used as the parameter to assign a particular flight to either the high or the low intensity set. A value for the variance of the airborne segment of a flight of 30.13×10^6 (psi)^2 was selected as the dividing point. Using this criteria the B-58 data set was divided so that 343 flights were assigned to the low intensity set, defined as Sequence A, and 282 flights were assigned to the high intensity set, defined as Sequence B.

The low intensity data contained 197,448 stress reversals or 98,724 complete cycles. Of these, 2097 were taxi cycles. The total data set contained 194,287 reversals which defined primary peaks (a peak between successive mean crossings) and a total of 3160 secondary reversals that were superimposed on the primary reversals. The average of the 1-g trim stress during the airborne portion of the flight was 12,920 psi with a variance of 12.1×10^6 (psi)^2. This average is the average of the 1-g stresses at the time of a stress reversal for the 193,255 peaks, see Table 1. The high intensity data set contained 86,121 stress reversals or 43,060 complete cycles, and 3226 of these cycles were associated with taxi or

ground operations. A total of 2499 reversals were secondary reversals. Table 1 is a summary of the statistical properties of the low and high intensity data sets for the B-58.

An examination of the table reveals some numbers that require additional explanation. As stated early the dividing line between the low and high intensity flights was based on a value of the variance of $30.13 \times 10^6 (\text{psi})^2$. That number is the variance of the stress reversals about the mean for that particular flight. The variance listed in Table 1 is the variance of all primary peaks about the mean of the entire data set (i.e., 190,438 points). When the variance is calculated for the stress reversals that are primary peaks and the deviation is measured from the instantaneous 1-g trim stress to the stress peak (or valley) then the variance for the Sequence A set is 19.8 ksi^2 and for the Sequence B set is 24.9 ksi^2. These latter values labeled the 1.0G Variance were calculated as follows.

$$1.0\text{G Variance} = \frac{\sum_{i=1}^{M} \sum_{i=1}^{N_i} (S_{ij} - G_i)^2}{\left(\sum_{i=1}^{M} N_i \right) - 1} \qquad (2)$$

where

S_{ij} = value of j^{th} peak or valley stress in the i^{th} flight

N_i = number of stress peaks for flight segment (ground or airborne) for i^{th} flight

M = number of flights in data set

G_i = 1-g trim stress for flight i

Also some comments are required about the means. The mean of the primary peaks is just the simple average of the 190,438 peaks. The mean of the weighted 1-g flight stress is the average of the 1-g trim stress at the time of a stress reversal. The 1-g trim stress values were determined by measuring the average 1-g stress value just preceding each stress reversal

which yielded a time history of the 1-g trim stresses for the entire flight. The fact that the averages of the primary peaks and the weighted 1-g stress are essentially the same is an indication that the deviations of the stress from the 1-g value is the same for increasing and decreasing deviations (i.e., plus and minus incremental stresses). This does not imply that the individual cycles are symmetrical about the 1-g trim value but only that when the total data set is examined there is symmetry between the positive and negative peaks. The fact that the 1-g stress on the ground is different from the preflight stress indicates that some of the data are from landings and some are from the take-off run just prior to lift off. The fact that the mean of the ground data and the mean of the 1-g ground data are different indicates that there are larger negative peaks than positive peaks.

The preflight stress is the true magnitude of the wing stress when the aircraft is parked with engines off. These values were used as the starting point for processing of the strain gage data.

Test sequences were also developed wherein taxi loads were omitted; however one ground load equal to the preflight stress was inserted at the beginning of each flight. The Sequence A data without taxi loads is identified as Sequence C, and the Sequence B data without taxi loads is identified as Sequence D.

2.2 F-106 DATA

The University of Dayton during the period from August 1970 to September 1971 had digital tape recorders installed on four F-106 Interceptors. In addition to the usual VGH data, strain gage data was recorded from a gage on the lower shoulder of spar number four at wing station 472 at buttock line 44.25. The recordings began at engine startup and ended at engine shut down, and therefore include taxi, take-off, and landing as well as the airborne portion of the flight.

The strain gage location was inboard of the landing gear and therefore the stress was tension when the aircraft was on the ground as well as when it was in the air. Consequently the strain at this location was not characterized by the typical ground-air-ground stress reversal. In fact the stress on the ground and the 1-g stress in-flight were the same.

The data was divided into two sets: a low intensity and a high intensity set. The variance, Equation (1), of the stress history was used as the measure of severity. The dividing point between low and high was chosen as 19.36×10^6 psi^2.

The low intensity data set had 381 flights with 52,128 stress reversals; 51,462 of these occurred during the airborne portion of the flight, and 48,446 were primary peaks. The average number of primary peaks per flight was 127. The variance, Equation (2), of the airborne primary peaks about the 1-g trim stress was 11.18 (ksi)^2.

The high intensity data set had 236 flights with 39,752 stress reversals; 32,636 of the reversals were airborne primary peaks. The average number of stress reversals was 138 and hence there was an average of 76 complete cycles per flight. The variance, Equation (2), of the peaks and valleys about the 1-g trim stress was 28.2 (ksi)^2.

Table 2 is a summary of some of the more significant facts about the data sets. Sequence E was the low intensity set and Sequence F was the high intensity set.

SECTION 3

TEST SPECIMEN

The test specimen was machined from 7075-T651 aluminum plate. The specimens were machined to the dimensions shown in Figure 1. The stress riser hole in the center of the specimen was first drilled to 0.375-inch diameter on a numerically controlled vertical milling machine. It was later redrilled to 0.386-inch diameter on a bench drill press. The specimens were machined from 1/4 inch rolled plate without any additional machining on the flat faces. In order to eliminate any biasing of the test results due to specimen location within the two plates that were used, the specimens were assigned consecutive numbers from random locations in the plates. The specimen locations are shown in Table 3. The length is the roll direction of the plate which is the 11 inch dimension of the specimen. It was the intent of this effort to use the same specimen that was used on a previous program. That program, the results of which are reported in References 3 and 4, used a specimen that had a 0.375-inch drilled hole in the center. The specimen for the previous program had a fatigue life of 50,500 cycles when tested at a constant amplitude of +5 KSI to +25 KSI net section stress. However, the specimens from the current program with a 0.375-inch diameter drilled hole had a fatigue life in excess of 250,000 cycles for the same loading.

In an attempt to make the fatigue strength of the specimens from the two programs similar, the 0.375-inch hole was reamed to 0.386-inch diameter. This reaming reduced the fatigue life to 67,200 cycles for the constant amplitude loading. Since this life was still greater than the 50,500 from the previous program, the following additional modifications were attempted: (1) the drilled 0.375-inch diameter hole was stress relieved at $200^{\circ}F$ for 24 hours, yielding a fatigue life of 105,200 cycles; (2) the 0.375-inch hole was drilled out to 0.386-inch diameter, yielding a fatigue life of

58,200 cycles; and (3) the 0.375-inch hole was drilled out to 0.386-inch diameter and then stress relieved at 200°F for 24 hours, yielding a fatigue life of 61,100 cycles. Since the stress relieving after redrilling did not cause any additional reduction in fatigue life the specimens were just redrilled to 0.386-inch diameter without stress relieving. The final configuration had a fatigue life of 58,200 cycles when tested at a constant amplitude of +5 KSI to +25 KSI.

The static material properties of the plates were determined and are presented in Table 4. Tensile specimens were machined from random locations throughout the plates. The results indicate that the plates were uniform in tensile properties.

SECTION 4

TESTING PROCEDURE

All cyclic testing was performed using the University's MTS closed-loop electrohydraulic fatigue test system which was programmed by signals from an FM recorder.

4.1 GENERATION OF TEST SEQUENCE TAPES

The loading spectra which resulted from the editing of the actual flight recordings was a digital tape of peak and valley stresses in the same sequence as they occurred during the flights. Now since 343 flights of Sequences A or C would not contain enough cycles to cause a failure, the 343 flights were arranged in a second and third order to give a test sequence of 1029 flights. The order of the cycles within a given flight was not rearranged. After the 1029 flights were applied to the specimens the same sequence was started again. For the B and D sequences, the 282 flights were rearranged into 5 additional orders to give a test sequence of 1410 flights. Again, the order of the cycles within a given flight was not changed. After the 1410 flights were applied to the specimens the sequence was restarted.

The same procedure was used for the F-106 data. The 381 flights of Sequence E were rearranged 11 times to give a test sequence of 4572 flights. The 236 flights of the Sequence F data were rearranged 14 times to give a test sequence of 3540 flights. As with the B-58 data the order of the cycles within a given flight was not changed during the rearrangement process.

As each flight of the B-58 data set was copied from the original edit files, the preflight stress and two calibration signals were inserted into the data. The preflight stress was inserted at the beginning of the ground

data and the calibrations signals between the ground and airborne data. For spectrums C and D which did not contain taxi cycles the preflight stress was followed immediately by the two calibration signals. Since the F-106 data did not have a negative strain for ground operations the calibration signals were inserted into the data differently. The preflight stress of +8360 psi was written 4 times at the beginning of each flight, a signal equal to +14,960 psi was written 4 times in succession once per flight if and when the stress peak following the calibration value exceeded 16,060 psi. The second calibration signal was inserted this way so that the calibration signal would not introduce an extra stress reversal. If a flight did not have a peak greater than 16,060 psi then the second calibration voltage was omitted for the flight.

After the digital tape was created it was used as an input to the Wright-Patterson Air Force Base Analog/Hybrid computer. The analog signal was generated by fitting half sine waves between the peaks and valleys. The output of the analog/hybrid computer which was in an analog voltage form was recorded on a frequency modulated (FM) tape recorder. The sinusoidal frequency during the digital to analog conversion was 80 Hz, however, when the FM tape was played back into the MTS testing system the tape was slowed down so that the testing frequency was 5 Hz.

Oscillograph playbacks of typical flights are presented in Figure 2. Figure 2(a) and 2(b) are the same B-58 flights with and without taxi cycles. Figure 2(c) is a section from an F-106 spectrum.

In an attempt to control the amount of plasticity at the edge of the stress riser hole the net section stress was limited to 30,000 psi tension. With a stress concentration factor of 2.54 on the net section stress this limited the maximum stress to 76,200 psi. The 0.2% offset yield stress was 75,600 psi. The net section compression stress was limited to -15,000 psi.

4.2 SPECIMEN INSTALLATION

The specimens were installed in the testing machines using the gripping device shown in Figure 3. During installation the bolts were tightened first while the specimen was loaded slightly in tension (100 pounds) then the wedges were tightened. During testing the tensile loads were transfered to the specimen by shear loads on the bolts and the compressive loads were transfered directly to the specimen by the wedges. The use of the wedges in combination with the bolts allowed tension-compression testing without any backlash in the bolt holes. Using the relatively stiff fixture and specimen it was possible to test the specimens without using an anti-buckling fixture.

4.3 CYCLIC TESTING

Cyclic testing was accomplished by using the FM tape signal as the command signal for the closed-loop testing system. The feedback signal for control was from a strain gage type load cell.

The FM recorder/reproducer used was a 14 channel system with two channels used for WOW and flutter compensation so 12 channels were used for test sequence data. Each test sequence (A, B, C, D, E, and F) was limited to approximately 300,000 cycles before the sequence was repeated. At a tape speed of 1.875 inches/second it required three channels to record the 300,000 cycles on 10.5 inch diameter reels. Each channel (track) of the tape contained approximately 100,000 cycles and provided 6 hours of testing time. Sequence A for example started on track 1 continued on track 2 and was completed on track 3. Sequence C started on track 4 continued on track 5 and was completed on track 6. Each track had a section of zero load recorded at the beginning and end of the test sequence. During testing the reproduce recorder would be started, and while the signal was at the zero load level, the output would be connected to the MTS system. After a track was reproduced, the output would be disconnected from the MTS system

while the signal was at zero load, and the tape rewound. The next track would then be used to program the machines. If after tracks 1, 2 and 3, for example, had been used and the specimen had not failed, then testing was continued by using track 1 over again and then track 2 again and so on.

Since the system used is completely analog, it is necessary to monitor the load/cell output to ensure that the gain of the FM system has not changed or that a DC offset has not occurred. The accuracy of the loadings was maintained by monitoring on an oscilloscope the calibration signals which were recorded periodically on the tape. In order to obtain a high sensitivity on the oscilloscope, the load cell output was input into a chopped-beam oscilloscope through two "Tektronic" Model 5A13N Differential Comparator Amplifiers. In using these Differential Comparator Amplifiers, the lower calibration voltage was set on one amplifier and the higher calibration voltage was set on the other amplifier. When the test spectrum was being applied to the specimen and when the periodic calibration pulses occurred, the difference between the actual load cell voltage feedback and the required calibration voltages was displayed on the oscilloscope screen. If both the gain and the DC level were correct then the output during the two calibration pulses would be zero. Since the output should be zero, the sensitivity (vertical deflection) of the oscilloscope could be set very high. The sensitivity was set so that 0.1 inches on the screen was equivalent to 30 psi net section stress. By frequent monitoring of the calibration pulses in the load cell output signal, the stress levels for the calibration signals were maintained within ±60 psi.

Cyclic testing was conducted on a 24 hour a day 5 days a week basis. The specimens were maintained at zero load over the weekends.

SECTION 5

SIMULATED TEST SEQUENCES

The strain gage data was processed to obtain statistical information on parameters considered appropriate to characterize the intensity of the flight data. Initially these processing efforts were restricted to the strain data that was used in the development of Sequences A and E as explained in Section 4. The strain data was processed to obtain statistical distributions of preflight stress, ground and airborne 1-g stress, stress cycles per ground and airborne operations and peak stresses. It was contemplated that the information on stress peaks could significantly influence test life. Consequently, different counting methods were used to obtain alternate sets of peak stress distributions. Having obtained these data sequences were developed and applied to test specimens to simulate Sequences A and E. The stress peak counting method employed to develop the simulation sequences that produced test lives that correlated with the strain based Sequences A and E test lives was selected for additional evaluation. Sequences were then developed to simulate the strain based Sequences B, C, D, and F.

5.1 B-58 SIMULATIONS

5.1.1 Folded Distribution

The first method used to generate a simulated test spectrum was the folded distribution of combined positive and negative primary peaks. A primary peak is defined as the maximum (or minimum) value of stress occurring between two successive crossings of the 1-g stress level by a continuous stress time-history trace. In order to generate the input data for the simulation program, the actual strain gage data was processed by a computer program to generate statistical distributions, in the form of a cumulative frequency distribution, of incremental stress peaks and valleys.

In order to conserve testing time only those peaks (valleys) greater than ± 3000 psi were used. Thus, an incremental peak stress represents an alternating stress superimposed on a 1-g trim stress.

Separate distributions were generated for the ground operations and the airborne flight segments. The frequency distributions of incremental stress peaks for the B-58 Sequence A data set is presented in Table 5 for the ground operations and also for the airborne operations.

Table 6 is a listing of the folded distribution (i.e., the sum of the negative and positive peaks) for the ground data for the B-58 Sequence A data. Since the parameter that is needed to generate a simulated test sequence is the relative probability, Table 6 lists the sum of the positive and negative peaks for the frequency and cumulative frequency distributions from Table 5 rather than the average of the number of peaks and valleys. The probability listed is the probability of a peak being equal to or greater than the absolute value of the stress value listed. Table 7 is a listing of the same type of data for the airborne flight segments.

Folded distributions of the primary stress peaks were used to generate random test sequences. A flight within the sequence was assembled by the following sequential steps:

(1) randomly select a preflight stress from the cumulative probability of preflight stress data (Table 8);

(2) randomly select a ground 1-g trim stress (Table 9);

(3) randomly select the number of stress cycles for the ground operations for that flight (Table 10);

(4) randomly select the magnitude of the cyclic stress for the first ground stress cycle (Table 6), add and subtract this value from the ground 1-g trim stress selected in step (2), and continue to repeat step (4) until the number of ground cycles required by step (3) is obtained;

(5) randomly select a 1-g trim stress value from Table 11 for the airborne segment of the flight;

(6) randomly select the number of stress cycles for the airborne segment of that flight (Table 12);

(7) randomly select from Table 7 the magnitude of the cyclic stress for the first stress peak of the airborne segment of the flight, add and subtract this value from the 1-g trim stress selected in step (5) to form the first stress cycle, and repeat step (7) until the number of cycles selected in step (6) is obtained.

A random number between 0.00000000000 and 1.00000000000 was selected by a random number generator then used to interpolate in the appropriate probability table to select values for the parameters in steps (1) thru (7).

This procedure completes the first flight. Now go back to step (1) and repeat the entire procedure until enough flights and cycles are generated to fill one track of the FM tape. The procedure is repeated again for a second and third FM channel.

In the actual simulation of the B-58 Sequence A data the first channel contained 420 flights with 105,651 stress cycles, the second channel 439 flights with 105,393 stress cycles and the third channel 459 flights with 105,303 stress cycles.

Table 13 is a listing of a typical summary sheet for the first 50 flights. The summary sheet is self explanatory except for two items, i.e., the cumulative number of peaks and points. The number of peaks is the sum of the number of ground and airborne stress reversals (2 per cycle), the number of points is equal to the number of peaks plus the number of points used for the preflight stress (4) and the ground calibration pulse (4) and the airborne calibration pulse (4) so that each flight has 12 more points

than peaks except the first flight which has 8 points of zero stress at the beginning. A summary of the total data set on each of the three channels is presented in Table 14. Table 14 also contains the summary data for the entire data set.

Note that there are two variances listed in Table 14 for both the ground and the airborne data. The one labeled stress variance was based on Equation (1) and the one labeled 1.0G Variance was based on Equation (2).

Table 15 is a listing of stress reversals for the start of each channel. This print out is from the digital tape which was used as input to the hybrid computer. A continuous analog signal for each channel was obtained by forcing a half cycle of a sine wave between the digital peaks and valleys. The resulting signals were then recorded on FM tape and later used to program the fatigue machines.

5.1.2 Bivariate Distribution of Positive and Negative Primary Peaks

The second method of generating a simulated test spectrum requires the strain gage data to be processed by a different computer program which sorts the primary peak data into a bivariate distribution of the peak stress in a cycle and the immediately following minimum stress. Table 16 is a listing of the maximum stress and the corresponding minimum stress of each cycle of the ground data for the B-58 Spectrum A data set. In this data set only those cycles wherein the maximum stress was more than 3000 psi greater than the 1-g trim stress were retained. The immediately following minimum did not have to exceed a minimum threshold but could have any value provided it was less than the 1-g trim stress. Table 17 is a bivariate distribution of peaks and corresponding valleys for each cycle of airborne data.

Table 18 is a listing of the cumulative probabilities for the peak stresses of the ground operations data and Table 19 is a listing of the

cumulative probabilities for the immediately following minimum stress for each peak stress for the ground operations data.

Tables 20 and 21 are the same type of data for the airborne segment of the flights.

All other data is the same as that used for the folded distribution described in Paragraph 5.1.1.

The method for generation of a test sequence from this data is the same as described in Paragraph 5.1.1 except for steps 4 and 7. For the bivariate distribution of peaks and valleys method, one must first select a random number and then find the corresponding magnitude of the peak stress (Table 18 for step 4 and Table 20 for step 7). This value of cyclic stress is added to the 1-g trim stress obtained in steps 2 or 5. Next, with a second random number, one selects a minimum stress from the distribution of valleys for that magnitude of peak stress (Table 19 or Table 21). The magnitude of the valley is then subtracted from the 1-g trim stress to determine the extremes of a complete stress cycle.

A summary of the first 50 flights is presented in Table 22.

A summary of the three channels of data used for the simulation of the B-58 data Sequence A is presented in Table 23.

Table 24 is a listing of the start of the data as it appeared on the digital tape that was used as input for the Hybrid computer.

5.1.3 Limited Folded Distribution

The third method used to generate a simulated test spectrum was identified as the Limited Folded Distribution. This method is similar to the Folded Distribution (Paragraph 5.1.1) in that the cyclic stresses are selected from a folded distribution of the primary peaks and are applied symmetrically about the 1-g trim stress; however, the other parameters (preflight stress, number of ground stress peaks per flight, ground 1-g

stress, number of airborne stress peaks per flight and the 1-g stress for the airborne flight segment) were selected from a small discrete distribution. The input data had only a few values for these parameters and the program did not interpolate for intermediate values. Tables 25 through 31 list the input data for the simulation program. Table 32 is a summary listing of the first 50 flights generated by the program. Note that the number of stress reversals for the ground segments have discrete values of 0, 4, 8, 12, and 78 and the airborne segments 74, 238, 454, 784, and 1620, respectively. Also note that the preflight and 1-g trim stress have only a few discrete values.

5.2 F-106 STRESS SIMULATION

5.2.1 Bivariate Distribution of Mean and Alternating Stresses

The basic principle of this method is to form a stress cycle from mean and alternating stress values chosen randomly from a bivariate distribution of mean and alternating stresses. First, a mean stress value is randomly chosen from the cumulative distribution of mean stresses. Then an alternating stress value is randomly chosen from the cumulative distribution of alternating stresses for the chosen mean stress value. A stress cycle is then formed by adding the alternating stress to the mean stress thereby obtaining the peak value of the stress cycle and by subtracting the alternating stress value from the mean the minimum value of the stress cycle is obtained. Separate bivariate tables are used for the ground and airborne data. To complete the description of a flight, the number of ground cycles and the number of airborne cycles for the flight are randomly chosen from the distributions of the number of ground and airborne cycles per flight. The input data for the computer program which generated the simulated flights for the F-106 Sequence E (Low Intensity) data set are presented in Tables 33 through 38. The cumulative distributions are entered with random numbers which are equated to the probabilities.

Summary information for the first 50 flights is presented in Table 39. The variance, Equation (1), of the stress reversals about the mean of the reversals is less than the variance, Equation (2), of the reversals about the 1-g trim value. The 1-g trim stress was taken as a constant value of 8360 psi. The difference in the variance is due to the unsymmetrical nature of the loadings with the positive incremental stresses being larger than the negative incremental stresses. The mean of all of the peaks and valleys is 10, 607 psi whereas the 1-g trim stress is 8360.

Using the bivariate distribution of mean and alternating stress 10, 094 flights were generated which contained a total of 570, 528 stress reversals or half that number of cycles.

The composite summary of all the flights is presented in Table 40.

5. 2. 2 Separate Positive and Negative Distributions

The second method used to generate simulated flights of the F-106 Sequence E data was identified as the Separate Positive and Negative Distributions. This method requires the random selection of a positive incremental stress and then a negative incremental stress from separate distributions of the primary peaks. The positive incremental stress is added to the 1-g trim stress (8360 psi) to obtain a stress peak and the negative incremental stress is added to the 1-g trim stress to obtain a stress minimum. Separate distributions are used to describe the ground and airborne data. To complete the description of a flight, the number of stress cycles for ground operations and the number of stress cycles for the airborne segment of the flight are selected randomly from distributions of the number of stress cycles for ground and airborne flight segments per flight.

The cumulative probabilities for the incremental stresses for the F-106 Sequence E data are presented in Tables 41 through 44. The

cumulative distribution of the number of stress reversals per flight (not cycles) is presented in Table 45 for the ground operations and in Table 46 for the airborne operations. A summary of the first 50 flights generated by this procedure is presented in Table 47. A summary of all the flights generated is presented in Table 48. There were 12,111 flights with 560,301 stress reversals used to fill three channels of the FM tape.

5.2.3 Limited Separate Positive and Negative Distributions

This method is similar to the method presented in Paragraph 5.2.2. The stress cycles are formed by randomly selecting a positive and a negative incremental stress from separate distributions and adding them to the constant 1-g trim stress 8360 psi. However, the number of cycles in the ground and airborne segments are chosen from a small discrete distribution.

The input data for the computer program is presented in Tables 49 through 54. A summary of the first 50 flights is presented in Table 55.

Table 56 is a presentation of the summary of all the flights for this method of simulation. A total of 12,495 flights with 552,579 stress reversals were generated.

5.3 SIMULATIONS FOR DATA SETS B-58 SEQUENCE B, C, D AND F-106 SEQUENCE F

After tests using the simulated sequences which were discussed in Paragraphs 5.1 and 5.2 were completed, the remaining data sequences were simulated using the best simulation technique for each type aircraft. For the B-58 that was the Bivariate Distribution of Positive and Negative Primary Peaks. For the F-106 the Separate Positive and Negative Distribution was used for the stress data.

5.3.1 B-58 Simulations for Sequence B, C, and D

The B-58 Sequence B data which were the high intensity flights were used to generate a test sequence using the bivariate distribution of peaks and corresponding valleys. This procedure is described in Paragraph 5.1.2. The input data is presented in Tables 57 through 66. The summary data of the simulated flights is presented in Table 67 for the first 50 flights and in Table 68 for the entire test sequence.

The simulated test spectra for the Sequence C and D data, which is really the B-58 low and high intensity data sets but without taxi cyclic stresses, used the same input data as the A and B sequences. The results of the simulation for the first 50 flights for Sequence C simulation is presented in Table 69 and the summary for all the flights in Table 70. The results of the simulation for the first 50 flights for Sequence D simulation is presented in Table 71 and the summary for all the flights in Table 72.

5.3.2 F-106 Simulations for Sequence F

The F-106 high intensity data, Sequence F, was used to generate a sequence of test loads using the method presented in Paragraph 5.2.2.

The input data which was obtained from processing the strain gage data into statistical parameters is presented in Table 73 through 78.

The summary of the first 50 flights is presented in Table 79 and the summary data for all of the Sequence F flights in Table 80.

SECTION 6

TEST RESULTS

All of the testing was conducted in the University's structural test laboratory at a temperature of approximately 72°F. The test specimens were assigned to the various tests in a chronological and sequential order starting with specimen number 1 (see Table 3) for test number 1.

In most instances six specimens were tested for each loading sequence. The final fracture was selected as the event to identify as the fatigue life of the specimen. The ratio of crack growth period to the total flights to failure varied from a minimum of approximately 0.07 (specimens with cracks growing on both sides of the starter hole) to a maximum of 0.22 (specimens with a single crack on one side of the starter hole). The basic test data indicates that on the average 85% of the fatigue life was used to initiate a visible fatigue crack at the starter hole.

6.1 FATIGUE LIFE

The fatigue life of each individual specimen tested with the original B-58 data sequences is presented in Table 81. Table 82 is the results of the F-106 original sequences.

The results of the fatigue tests using simulated test sequences are presented in Table 83 for the B-58 Sequence A and Table 84 for the F-106 Sequence E. The comparison of fatigue lives must be made on the basis of flights to failure, not cycles, since the number of cycles per flight varies with the simulation method and the threshold level.

Since the method which used the bivariate distribution of primary peaks and corresponding valleys (Paragraph 5.1.2) gave acceptable correlations for the B-58 Sequence A data, the limited distribution (Paragraph 5.1.3) wa s not tested. The remaining sequences of the B-58 data set were

simulated using the method of bivariate distribution of peaks and corresponding valleys. The results of the tests using the simulated spectra for Sequences B, C, and D for the B-58 are presented in Table 85.

The best correlation for the F-106 Sequence E data set was obtained for the limited separate peak and valley distributions; however, the regular separate peak and valley also gave acceptable correlation and since it was more complex (and therefore have broader application) we decided to use the regular separate peak and valley (Paragraph 5. 2. 2) distributions for the Sequence F simulations. The results for the F-106 simulations for Sequence F are presented in Table 86.

The average life of the tests for each sequence is presented in Table 87. Only the flights to failure are listed in the table since the number of cycles per flight varied depending on the simulation method and the truncation level. The comparison must be made only on the flights since this was the only criterion used in the simulations.

6. 2 CRACK GROWTH

The length of the fatigue crack was measured on most of the specimens. The measurements were made with a 30x telescope mounted on a micrometer slide as shown in Figure 4.

The data presented in Figures 5 through 19 show the relationship of crack length versus flights for different test sequences after an initial crack length of 0. 3 inch was established. A baseline crack length of 0. 3 inch (distance from center of starter hole to crack tip) was selected to provide a common starting point since the start of visible crack growth occurred at different numbers of flights and cycles for the various test sequences. Crack length data is plotted versus flights rather than cycles since the criteria for the threshold stresses were different for each simulation

technique and for the original data. The plots were terminated when one side of the specimen fractured or when a visible crack was established on the opposite side of the starter hole.

SECTION 7

DISCUSSION

Perhaps the best way to visualize the objective and results of this program is to think of the program in two parts, the B-58 data and the F-106 data.

7.1 B-58 DATA CORRELATION

The results of all the testing using the B-58 data is presented pictorially in Figure 20. These results, also see Table 81, indicate that the average number of flights to failure was approximately the same when using the Sequence A or Sequence B spectra. However, Tables 20 and 65, which present the distribution of airborne peaks for Sequence A and Sequence B respectively, show that Sequence A contained over twice the number of peaks in comparison with Sequence B. These tables also show that approximately 50% of the peaks were less than 4,500 psi and that both data sets contained the same number of peaks above 8,000 psi. It would appear therefore that there was little difference in the severity of the Sequence A and Sequence B data sets and that the damage per cycle below stress levels of 5,000 psi was small or non-existant. It would also appear that the use of threshold values below 4,000 psi, in an effort to reduce the testing time requirements, did not significantly affect the fatigue lives.

It should be noted that the separation of the original data into low intensity (Sequence A) and high intensity (Sequence B) data sets was accomplished to demonstrate that the subsequent data simulation methods would be applicable when using different data sets. However, the separation of the B-58 data which is a more gust sensitive aircraft yielded data sets of approximately the same intensity (on a damage per flight basis) except that the low intensity data set contained a significantly larger number of low

value stress peaks. One could also conclude that the operational missions of the B-58 fleet were relatively consistent and that differences in resulting spectra were due to environmental atmospheric conditions.

Referring again to Figure 20 one can see that when the taxi cycles were omitted from the Sequence A original data that the fatigue life increased from 2,536 flights to 3,697 flights. This result was somewhat surprising at first; however, when one considers that when the taxi cycles were omitted the minimum stress on the ground was then the preflight stress and not as negative as the taxi cycles then it is not as surprising. Figure 2(a) and 2(b) depict the difference in the minimum ground stress very dramatically when the taxi cycles are omitted. We now believe that rather than using the preflight stress as the ground stress, if one is omitting taxi cycles, we should use the minimum stress in the ground mission segment (for that flight) as the ground stress. Reference 5 presents some data on this for crack growth but not for crack initiation. For simulations we suggest that one use a distribution of minimum stresses for the ground data rather than a distribution of preflight stresses. In other words, the stress that was used as the ground stress for the Sequence C simulation which is listed as preflight stress (Column 2) in Table 29 should be replaced by the minimum ground stress data (Column 7) of Table 22. Additional insight to the effect of ground cyclic stresses will be obtained as a result of a current testing program (AF 33615-74-C-3007).

The simulated D sequence does not follow the other trends, i.e., for all but the simulated D sequence the simulated sequences using the bivariate distribution of peaks and corresponding valleys have slightly shorter lives than the original strain gage data. No reason for this opposite result is known other than possibly experimental scatter.

The tests using the folded primary peak spectra yielded a much shorter fatigue life and as expected is a more damaging sequence than the real flight situation.

A general comment is in order about the maximum stress in the sequence. As stated before, the maximum net section stress was limited to 30,000 psi; however, at the start of testing we used a truncation level of 34,500 psi and also 33,000 psi. The Sequence A spectrum was used for testing and resulted in longer lives for some of the specimens but also much larger scatter in the fatigue lives. The use of a spectrum that has tensile stresses that induce notch yielding appears to cause residual compressive stresses that cause longer fatigue lives. This phenomenon of retarded crack growth rate and increased fatigue life due to tensile overloads has been well documented in the literature (see, for example, References 5, 6, 7, and 8). When one is using a test sequence that has stresses which could cause yielding at the notch it is very important not to exceed the maximum stress, even the normal scatter in the yield stress of the material may cause yielding in some specimens and not in others.

We believe that the results presented in Figure 20 for the B-58 are a correct representation of the fatigue life of the specimens. The best and also good correlation was obtained using a simulated test sequence wherein the loads were randomly selected from a bivariate distribution of positive primary peaks and corresponding primary valleys.

7.2 F-106 DATA

All of the F-106 data set test results are presented pictorially in Figure 21. The results clearly show the effect of the severity of the two sequences. The E sequence being more mild than the F. Table 44 which is the distribution of primary stress peaks for the E sequence lists 962 stress peaks greater than 10,000 psi whereas Table 76 lists 2419 peaks greater than 10,000 psi for the F sequence. Looking at the cumulative probability one can see that in the E sequence only 6.8% of the primary peaks are greater than 10,000 psi whereas for the F sequence 22.4% are greater than 10,000 psi.

The use of the bivariate distribution of mean and alternating stresses cause a much shorter fatigue life. This was due mostly to the shift in the mean stress from cycle to cycle during the simulation. This result is illustrated in Figure 22. The variance, Equation (2), of the incremental peaks and valleys of the cycles for the simulation using bivariate distributions of mean and alternating stresses was 28.5 KSI^2 as compared to the variance of 22.6 KSI^2 for the simulation using the separate positive and negative distributions of primary peaks. Both variances were calculated using a constant 1-g trim stress for 8360 psi.

The simulation tests using separate distributions of primary peaks and valleys resulted in fatigue lives that were only slightly greater than those using the original strain gage data. The difference in the average life is about 11%; however, there is overlap in the scatter bands as can be seen on Figure 21. The fact that the separate peak and valley and the limited separate peak and valley gave the same fatigue life is not surprising since the F-106 data did not have a variable 1-g trim stress or a GAG cycle.

7.3 CRACK GROWTH CURVES

The crack growth curves presented in Figures 5 through 19 are evidence that the rate of crack growth is dependent on the loading spectrum. The data also indicates that after the crack has propagated to the point where the plots were started there are very few areas where crack growth was arrested for a time.

SECTION 8

CONCLUSIONS

1. The use of a load sequence wherein the stress reversals were arranged by a random selection from a bivariate distribution of the primary peaks and the corresponding valleys yielded fatigue lives that were equivalent to the lives using the original strain gage data for a gust sensitive aircraft.

2. The use of a load sequence wherein the stress reversals were arranged by a random selection from separate distributions of the primary peaks and valleys yielded fatigue lives that were equivalent to the lives using the original strain gage data for a maneuver sensitive aircraft.

3. The proper representation of the minimum stress in a flight is necessary for good simulation. The minimum stress for a good simulation, in which ground cycles are omitted, is the minimum value of the ground stress and not the pre-flight trim stress.

4. Test sequences can be developed that provide proper simulation of strain history data. In addition to the distribution called for in 1 and 2 above, statistical distributions of the number of stress cycles per flight for ground and airborne operations and a distribution of 1-g trim stresses are required.

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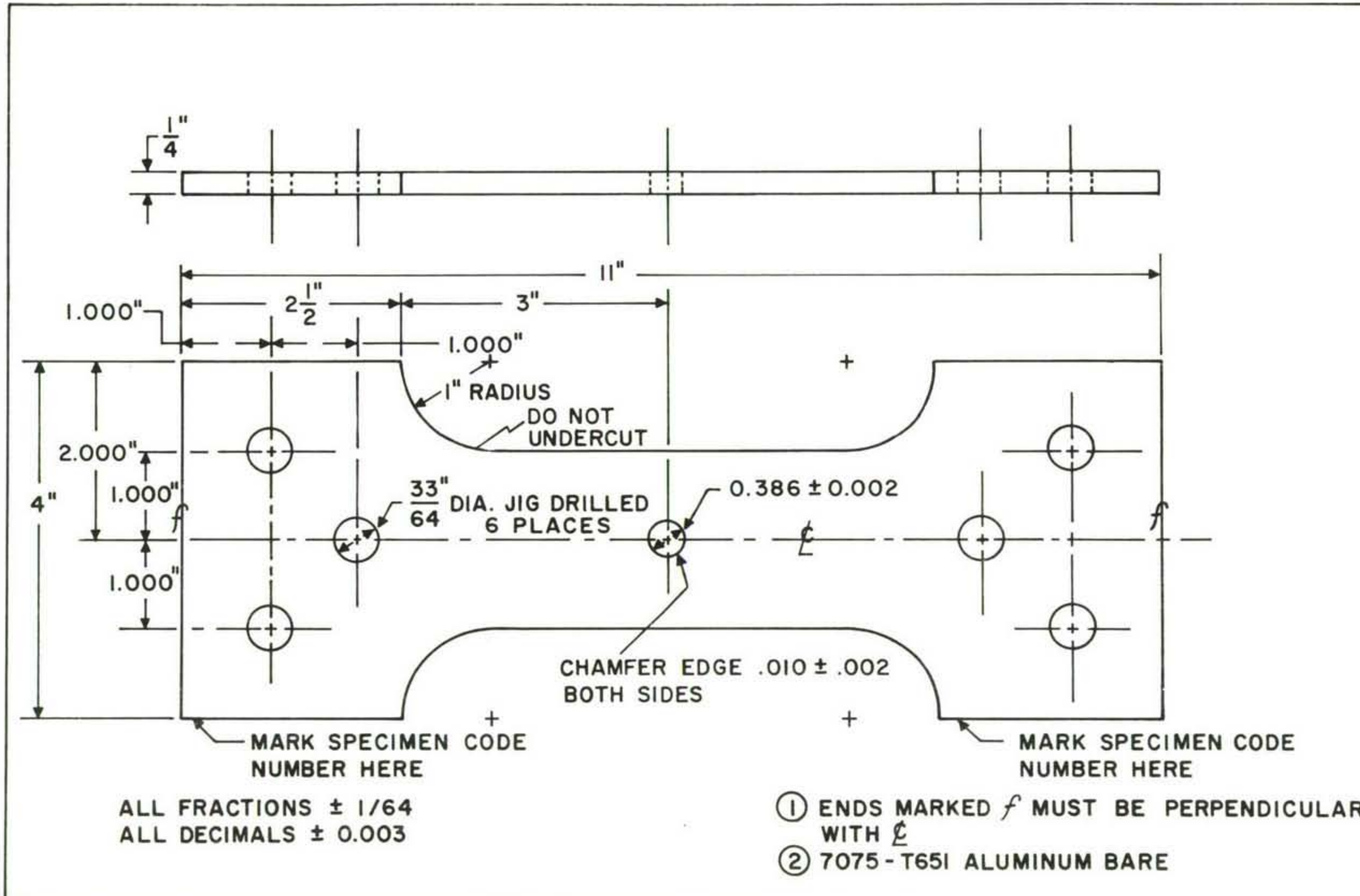


Figure 1. Cyclic Test Specimen.

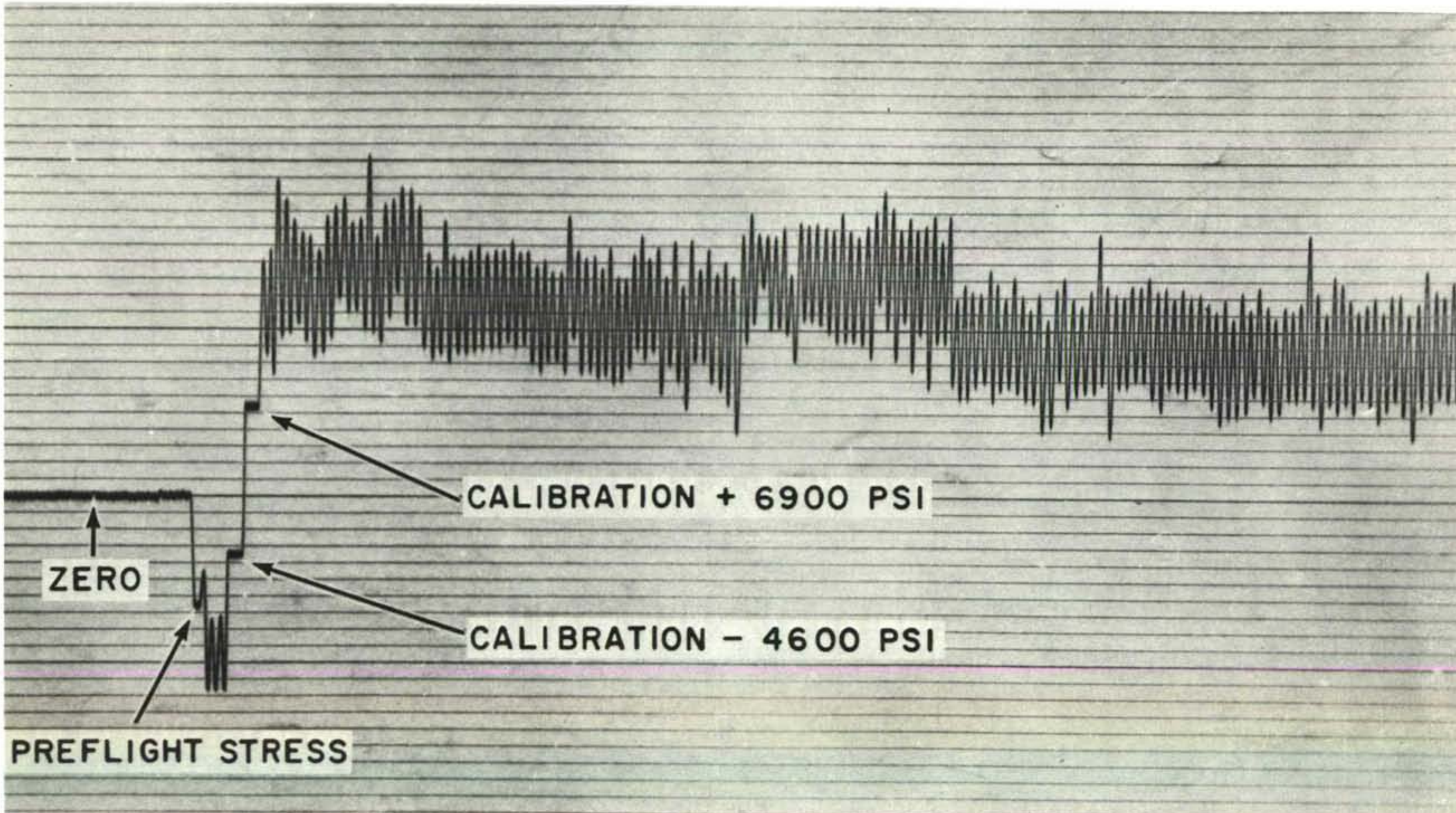


Figure 2(a). Typical Stress Sequence for B-58 Spectrum with Ground Loads.

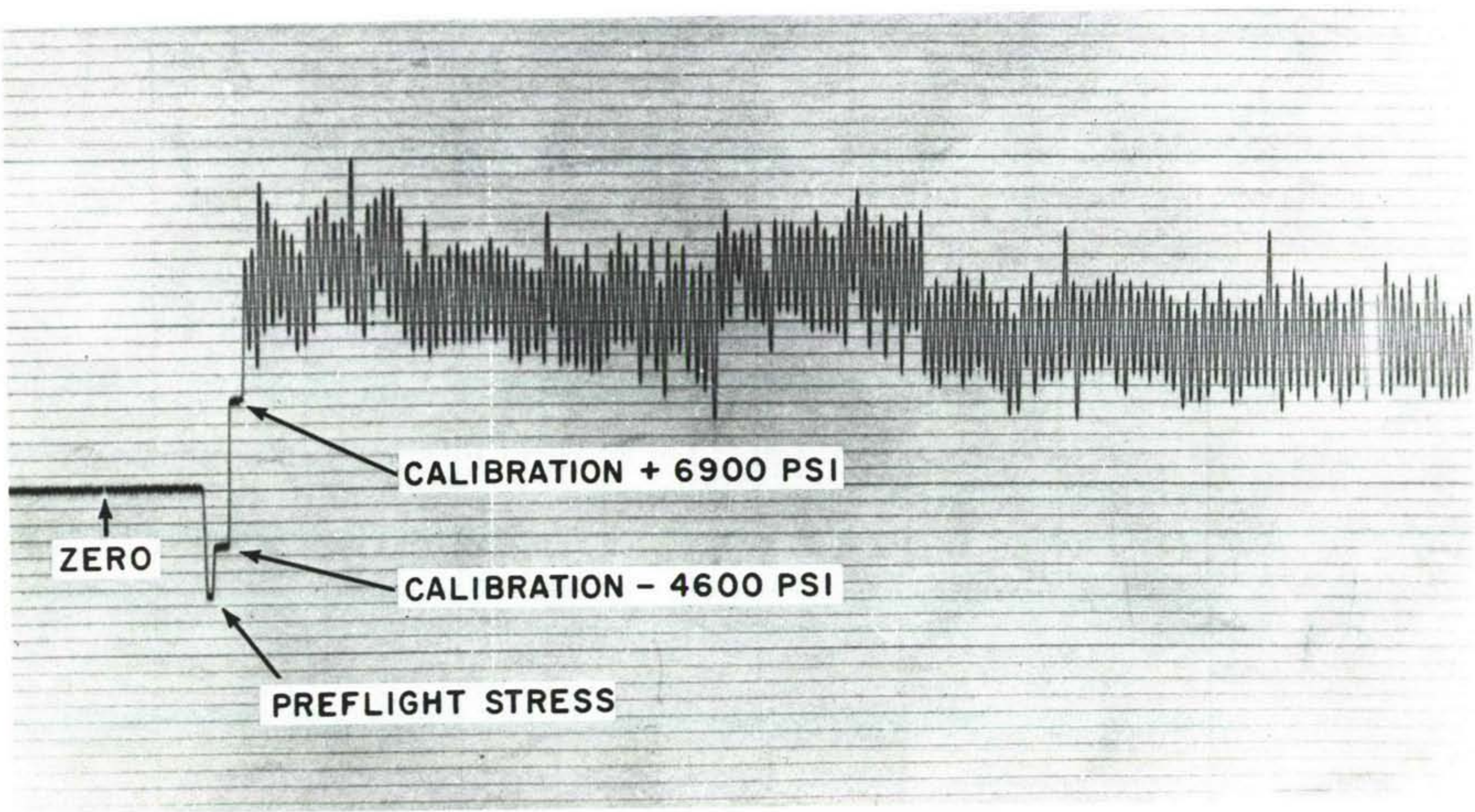


Figure 2(b). Typical Stress Sequence for B-58 Spectrum without Ground Loads.

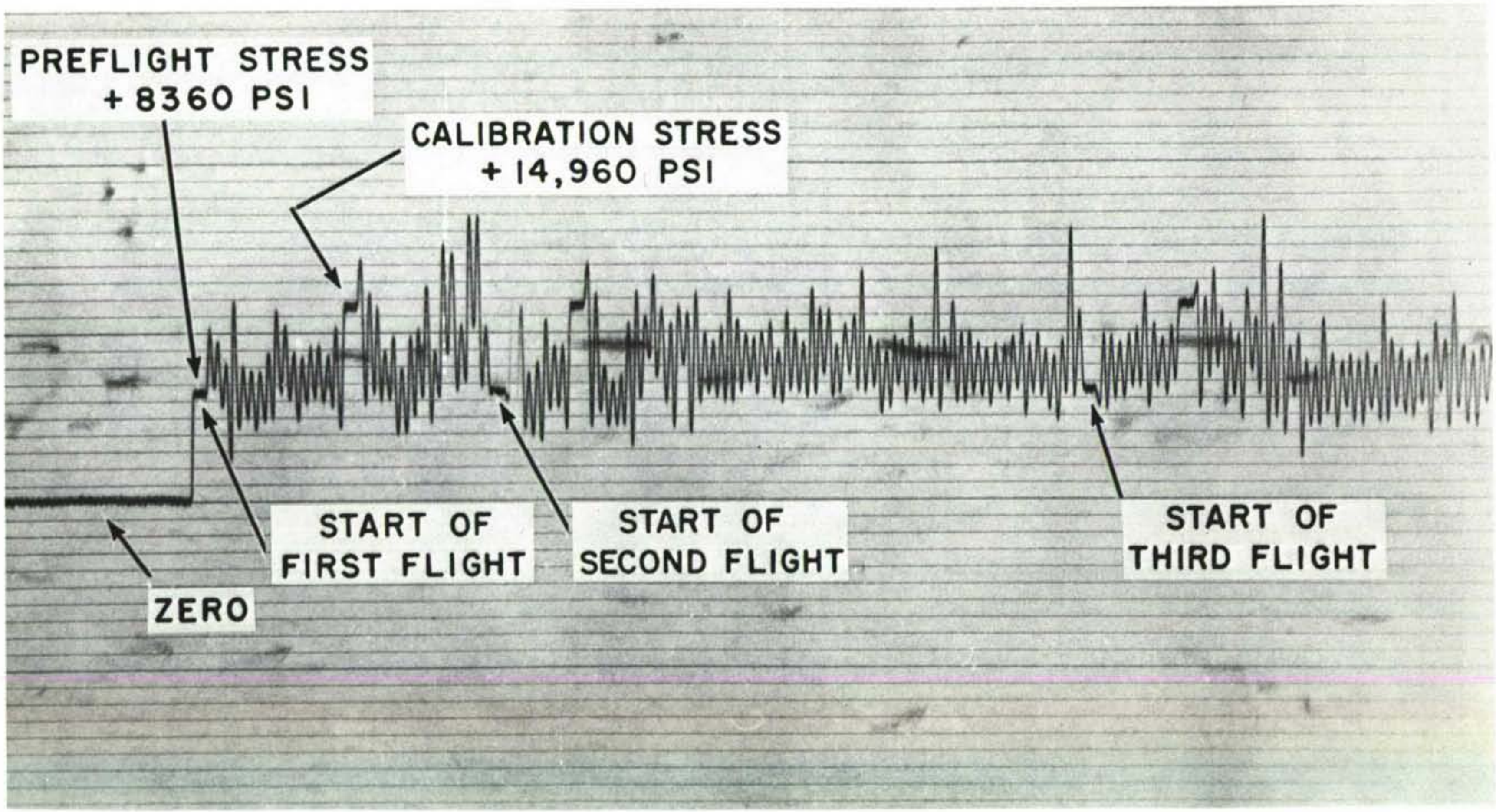


Figure 2(c). Typical Stress Sequence for F-106 Spectrum.

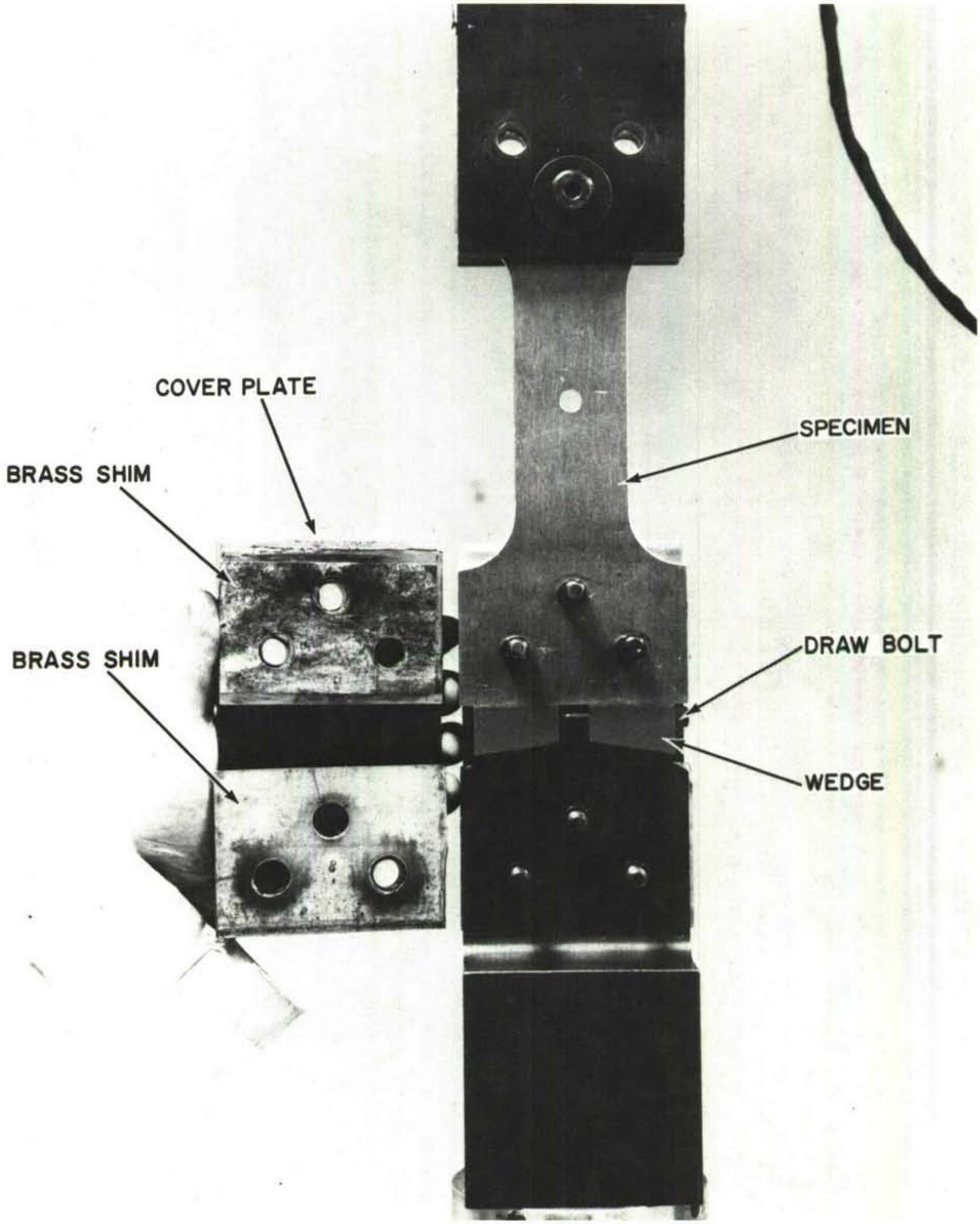


Figure 3. Specimen Installation Procedure.

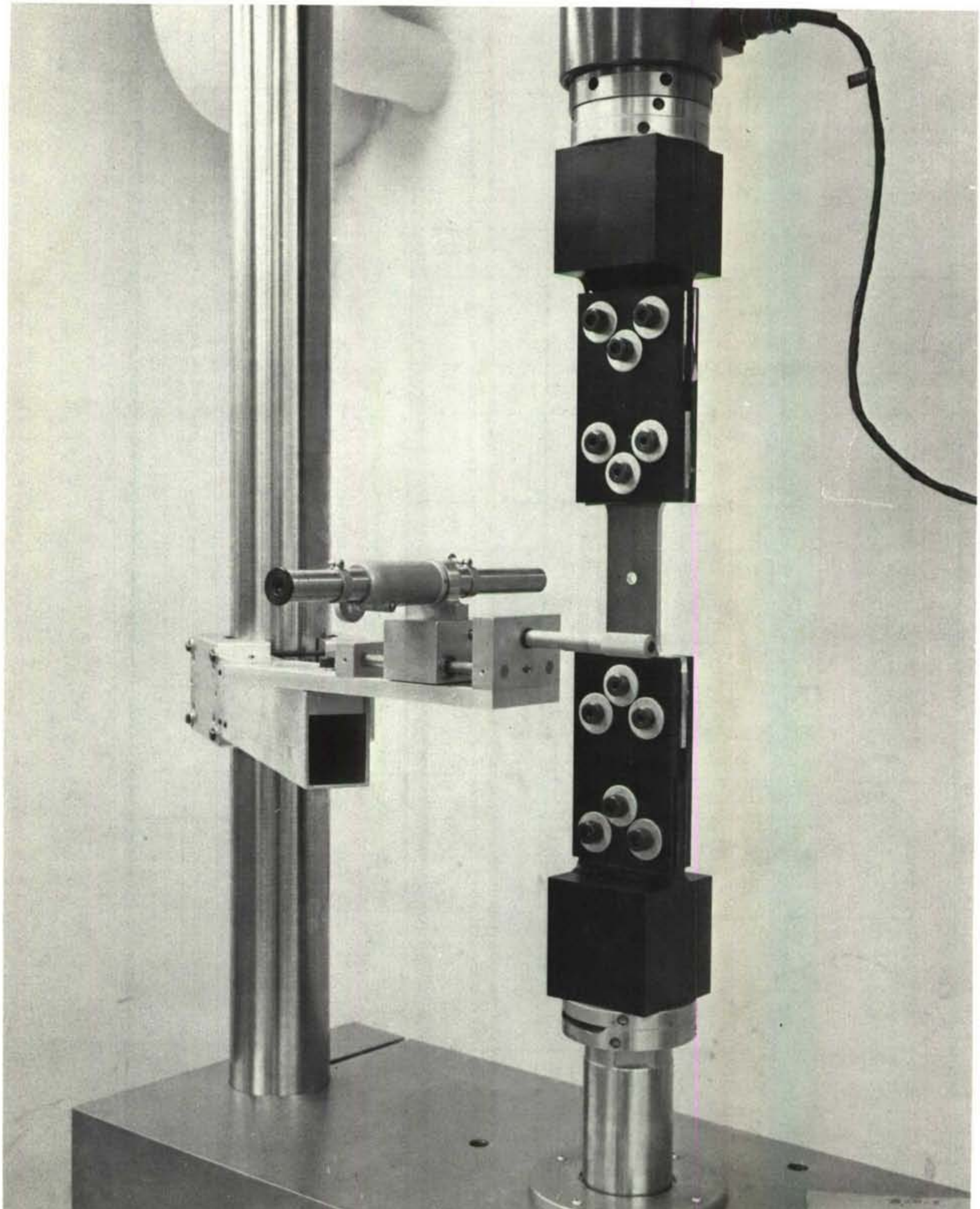


Figure 4. Telescope Setup for Crack-Growth Measurements.

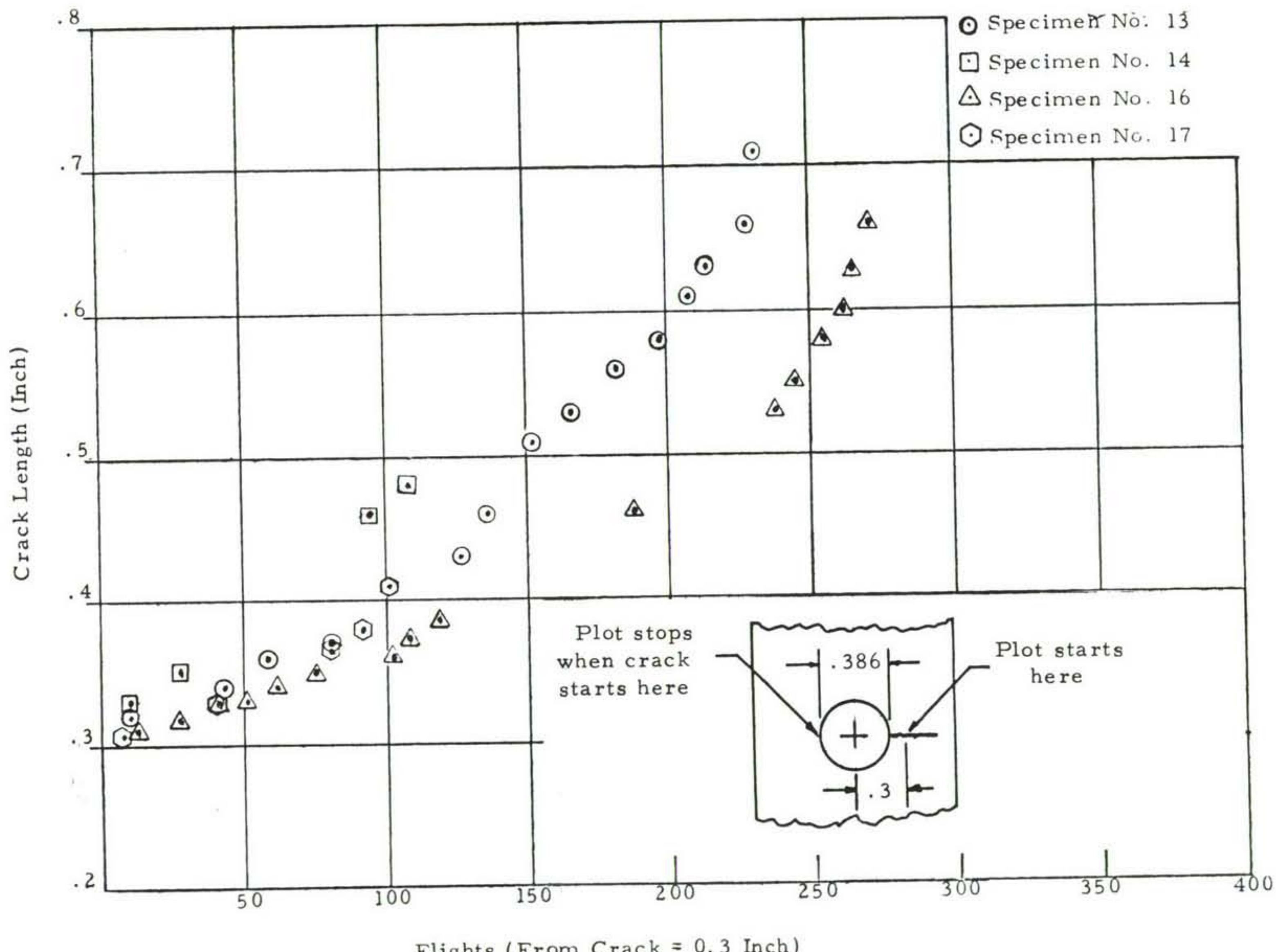


Figure 5. Crack Length vs Flights, B-58 Sequence A Original Data.

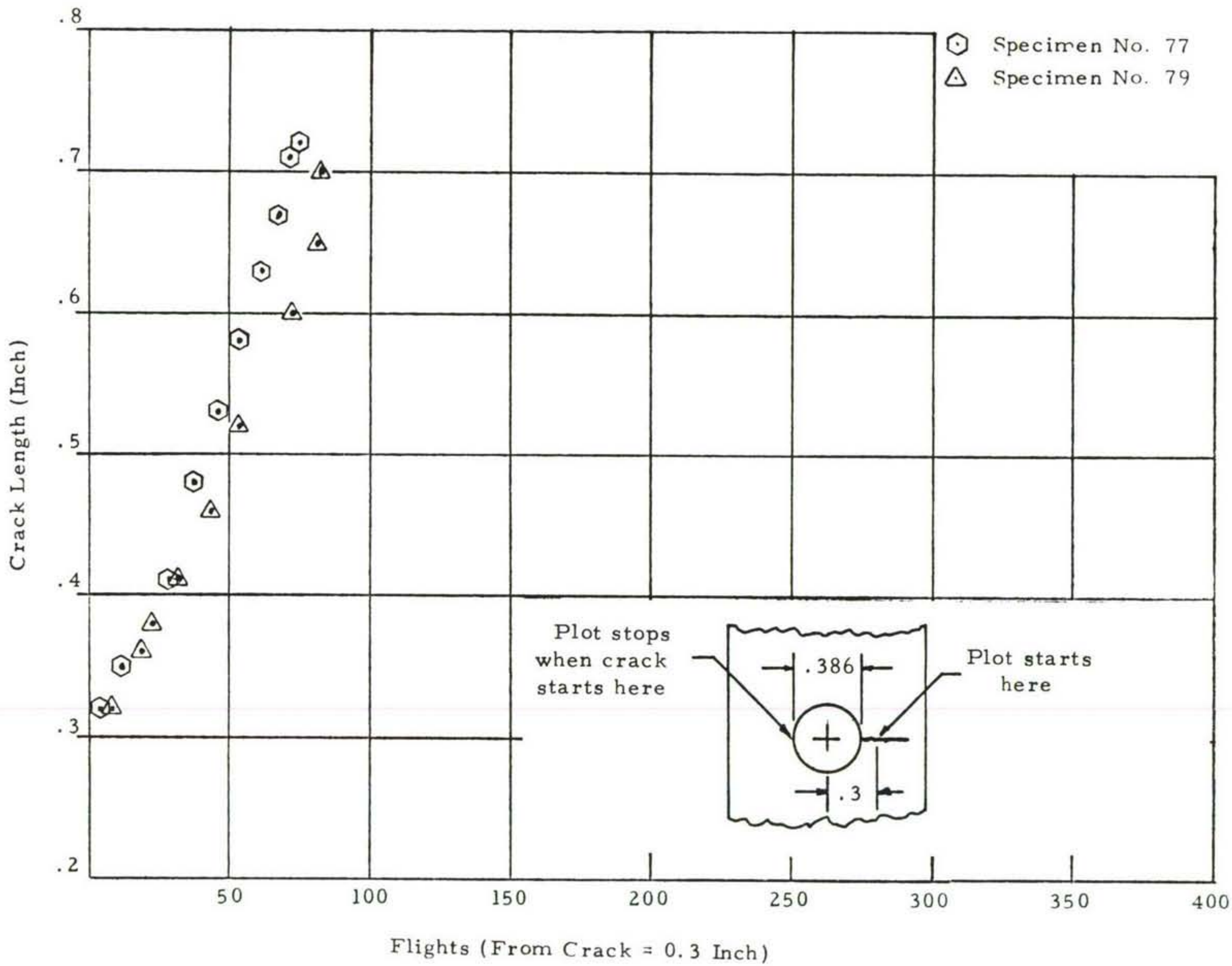


Figure 6. Crack Length vs Flights, B-58 Sequence A Folded Distribution Data.

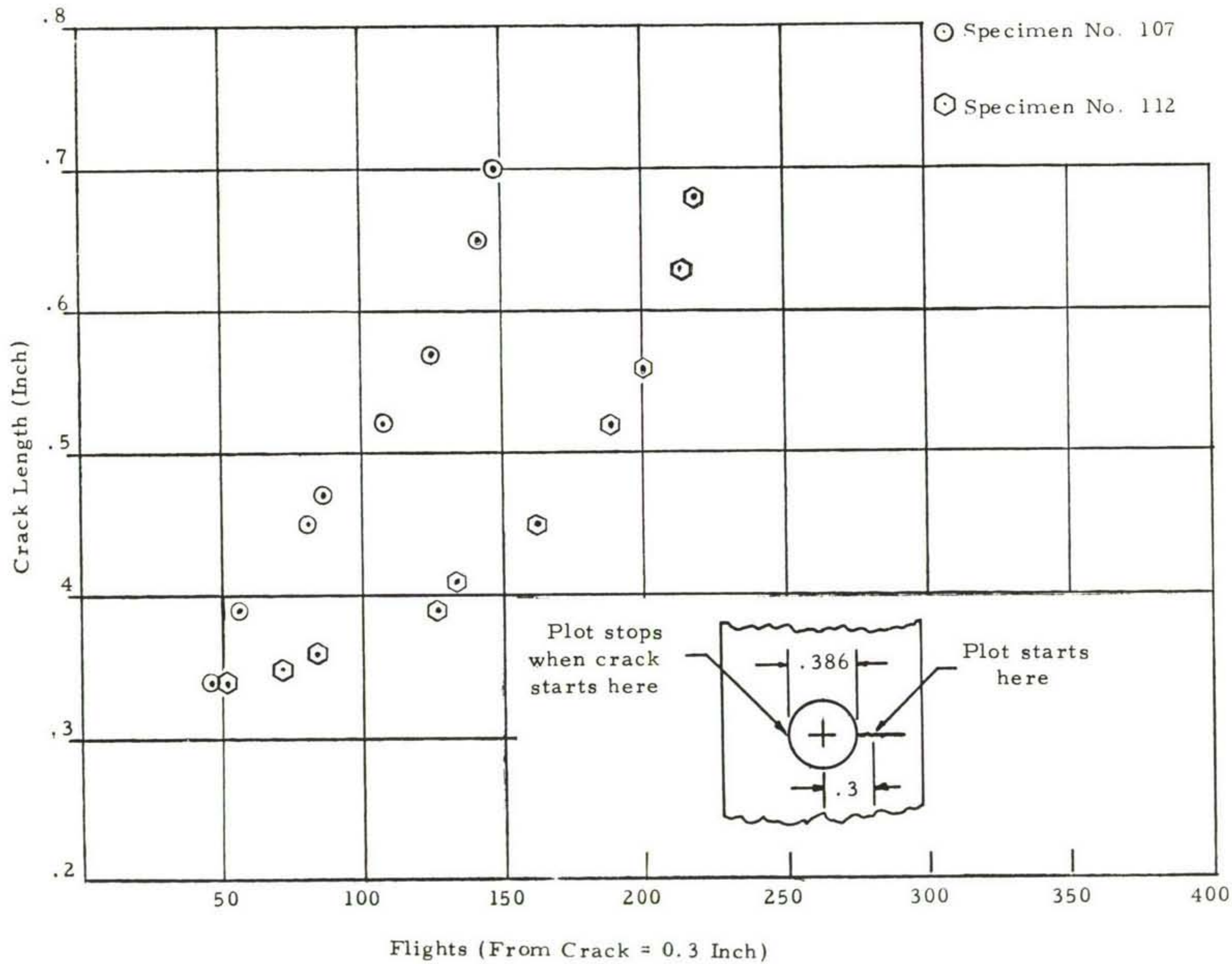


Figure 7. Crack Length vs Flights, B-58 Sequence A Bivariate Peak and Valley Simulation.

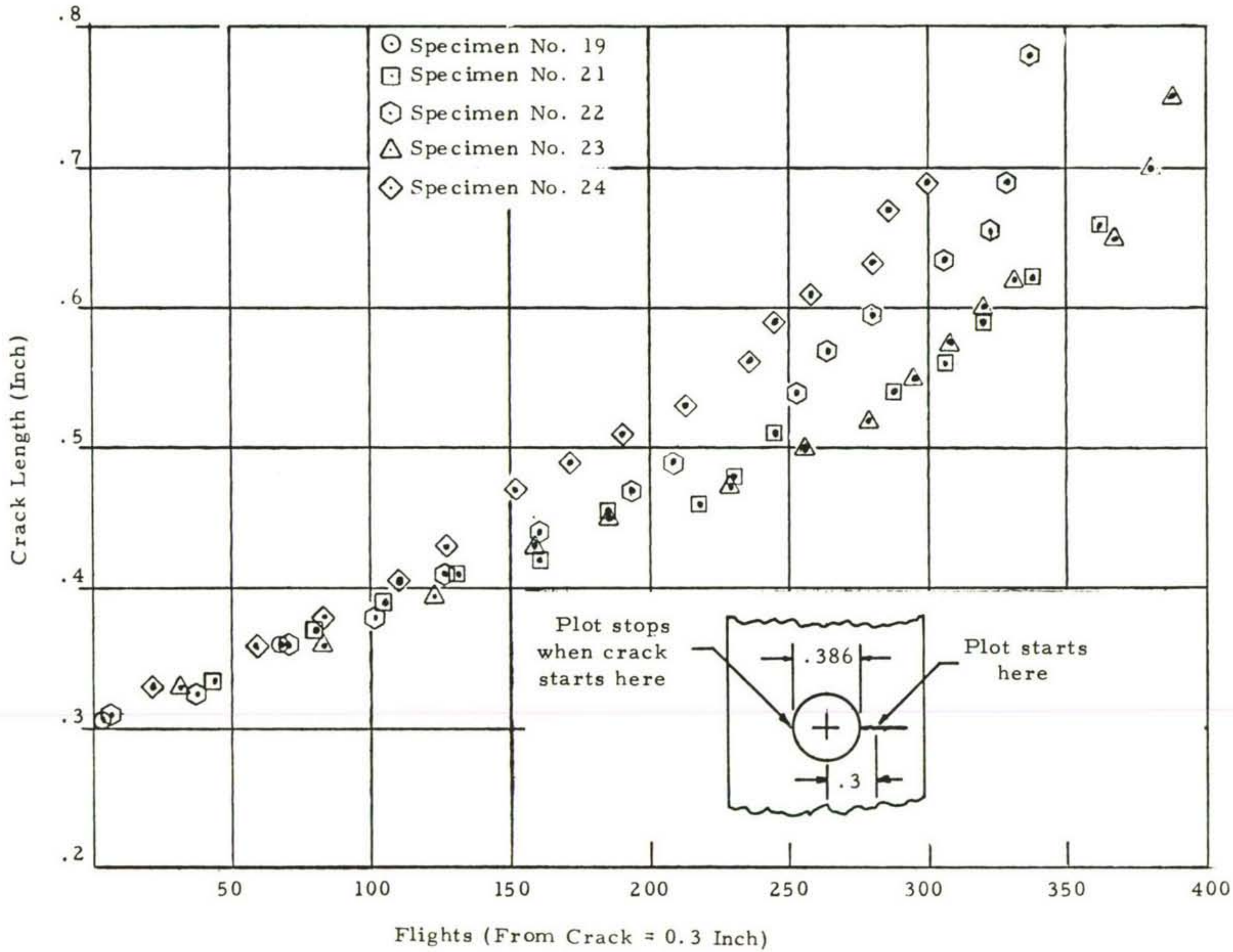


Figure 8. Crack Length vs Flights, B-58 Sequence C Original Data.

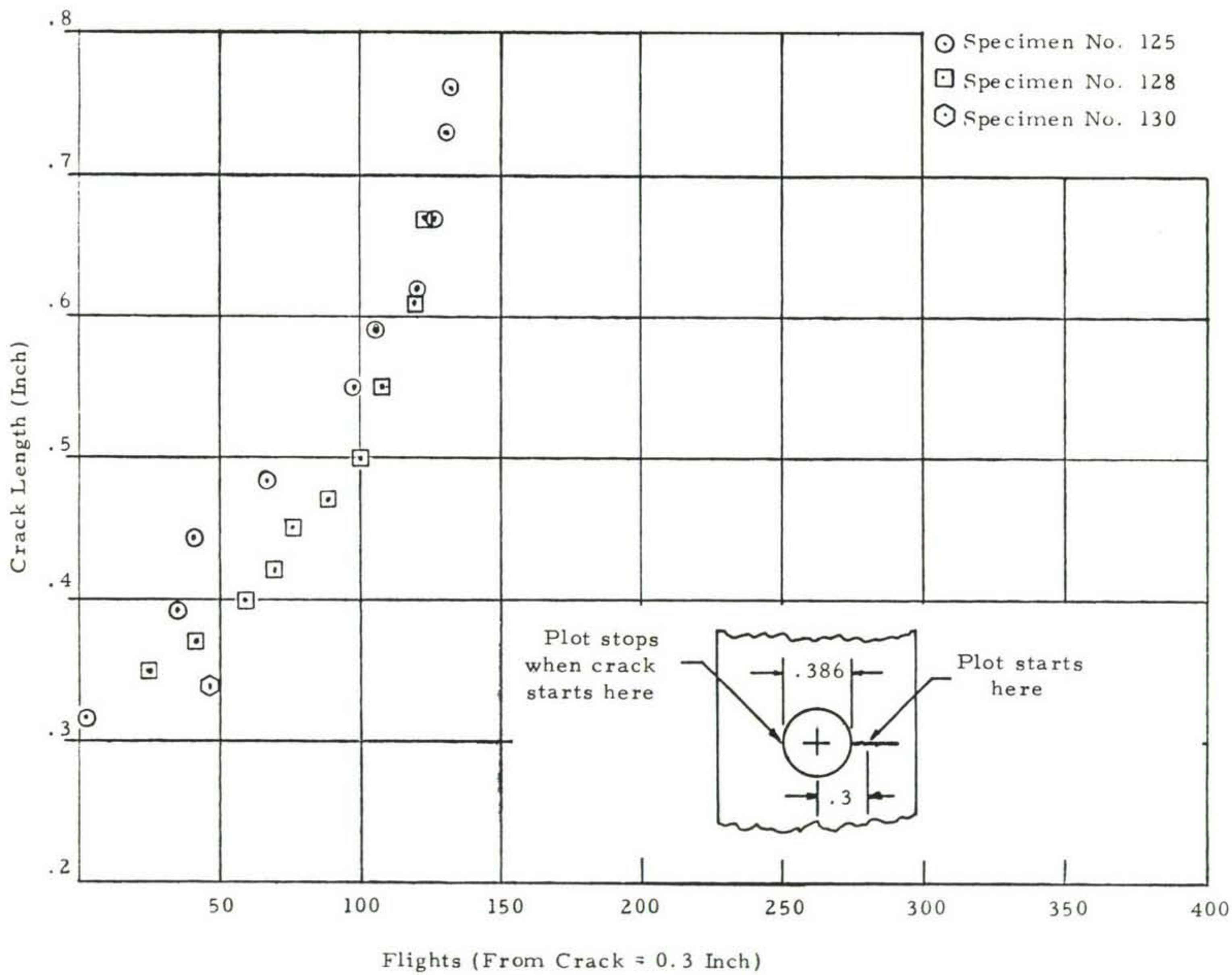


Figure 9. Crack Length vs Flights, B-58 Sequence C Bivariate Peak and Valley Simulation.

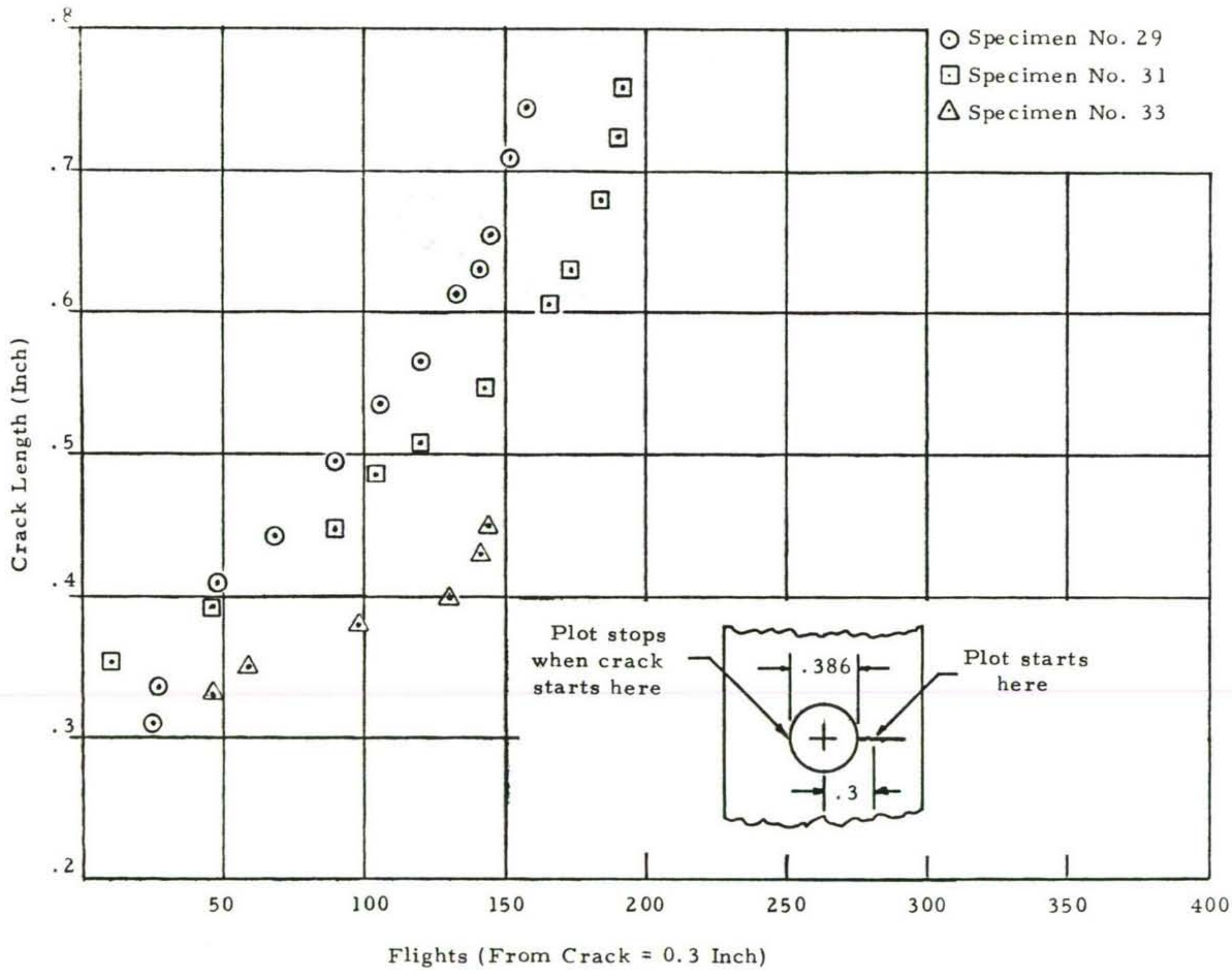


Figure 10. Crack Length vs Flights, B-58 Sequence B Original Data.

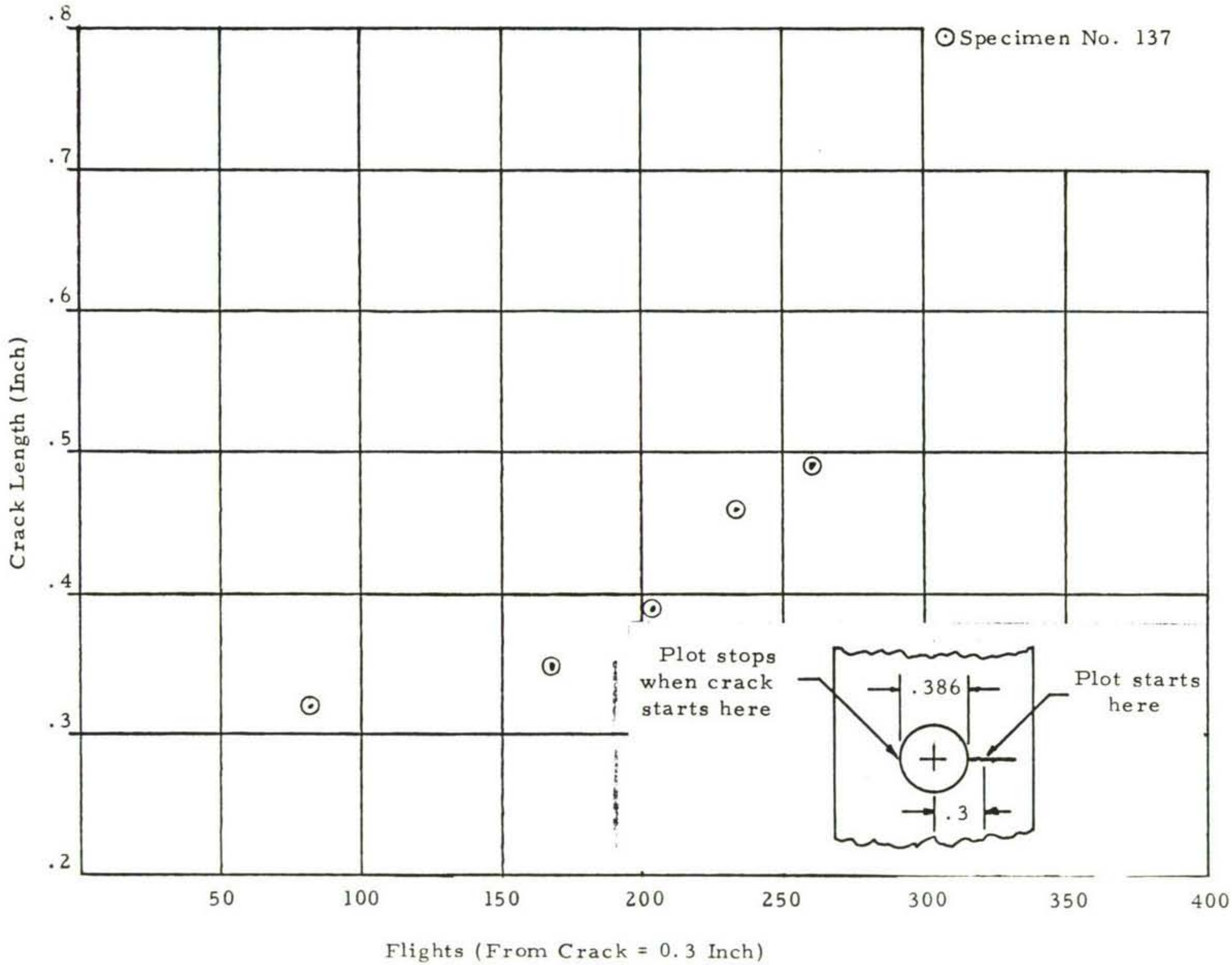


Figure 11. Crack Length vs Flights, B-58 Sequence B Bivariate Peak and Valley Simulation.

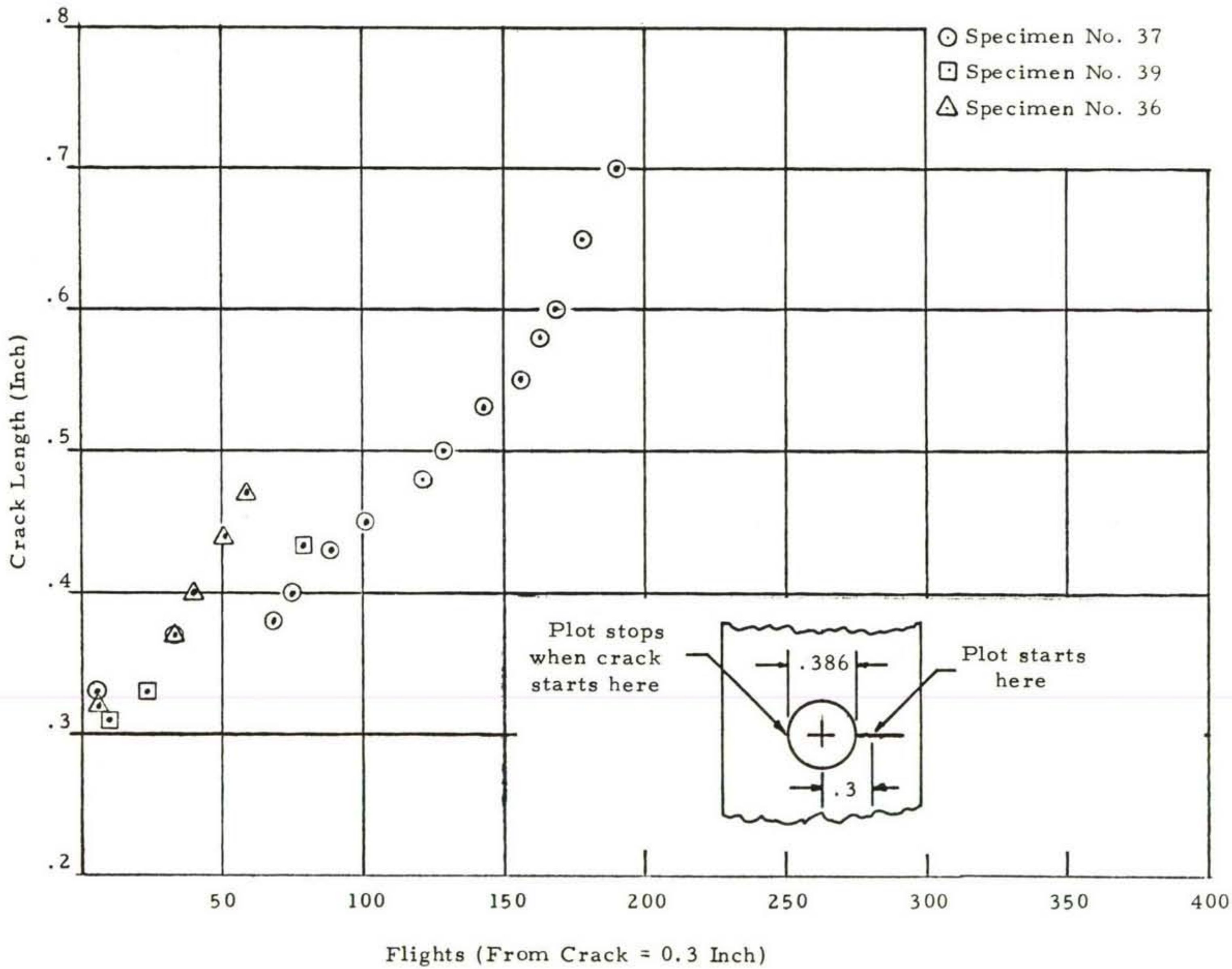


Figure 12. Crack Length vs Flights, B-58 Sequence D Original Data.

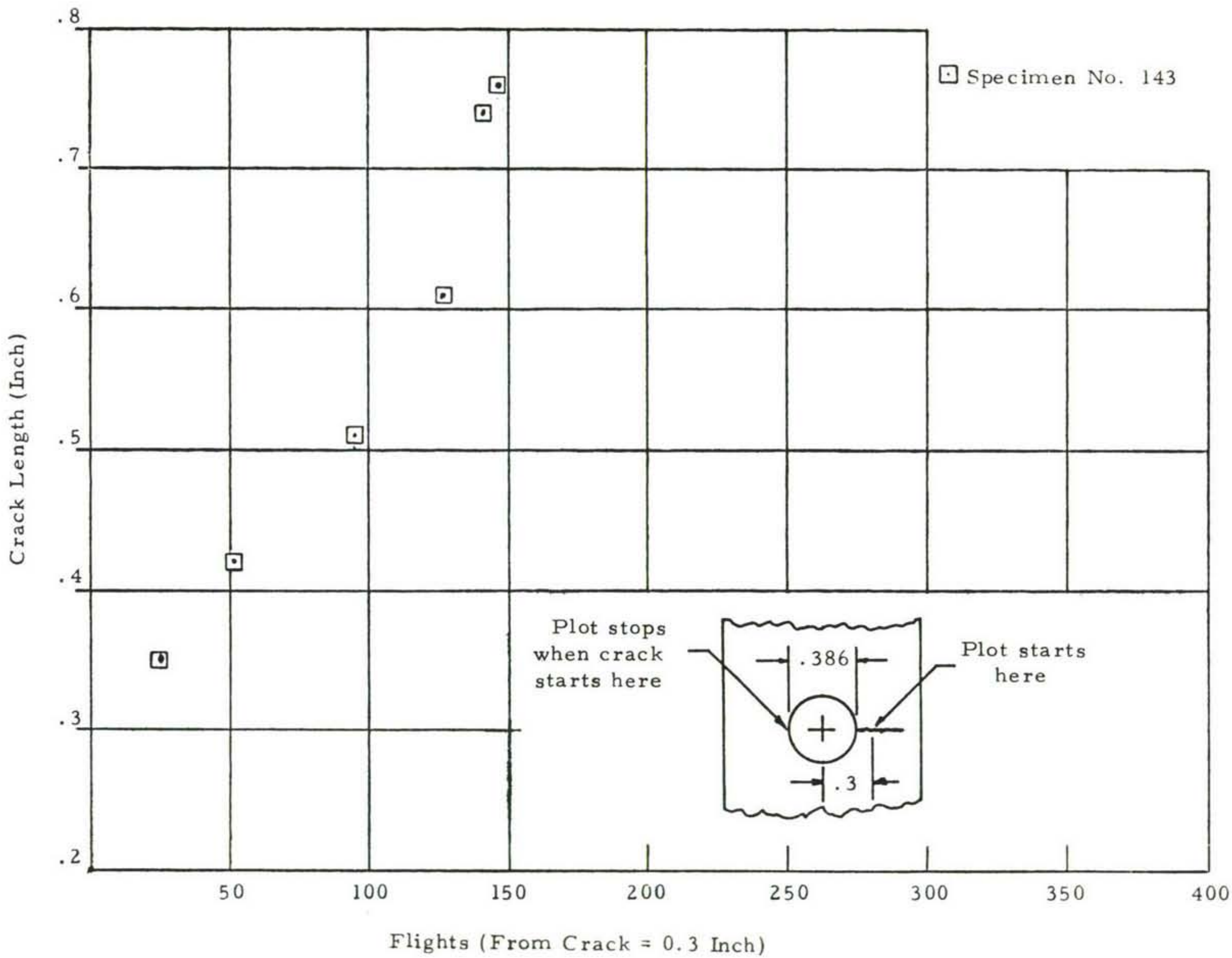
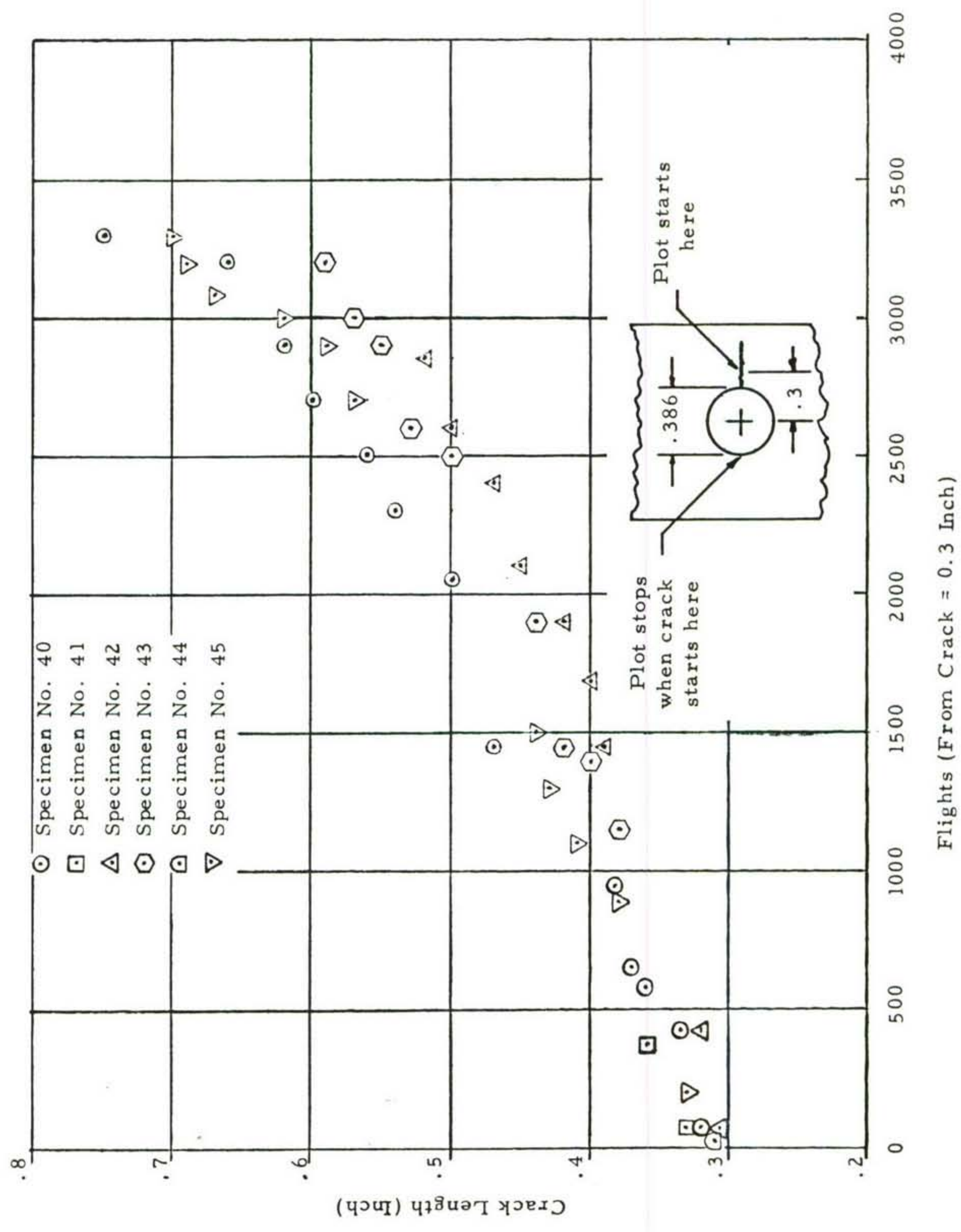


Figure 13. Crack Length vs Flights, B-58 Sequence D Bivariate Peak and Valley Simulation.


Specimen No. 40
Specimen No. 41
Specimen No. 42
Specimen No. 43
Specimen No. 44
Specimen No. 45
Plot stops when crack starts here
Plot starts here
.386
.3
Crack Length (Inch)
.2
.3
.4
.5
.6
.7
.8
Flights (From Crack = 0.3 Inch)
0
500
1000
1500
2000
2500
3000
3500
4000

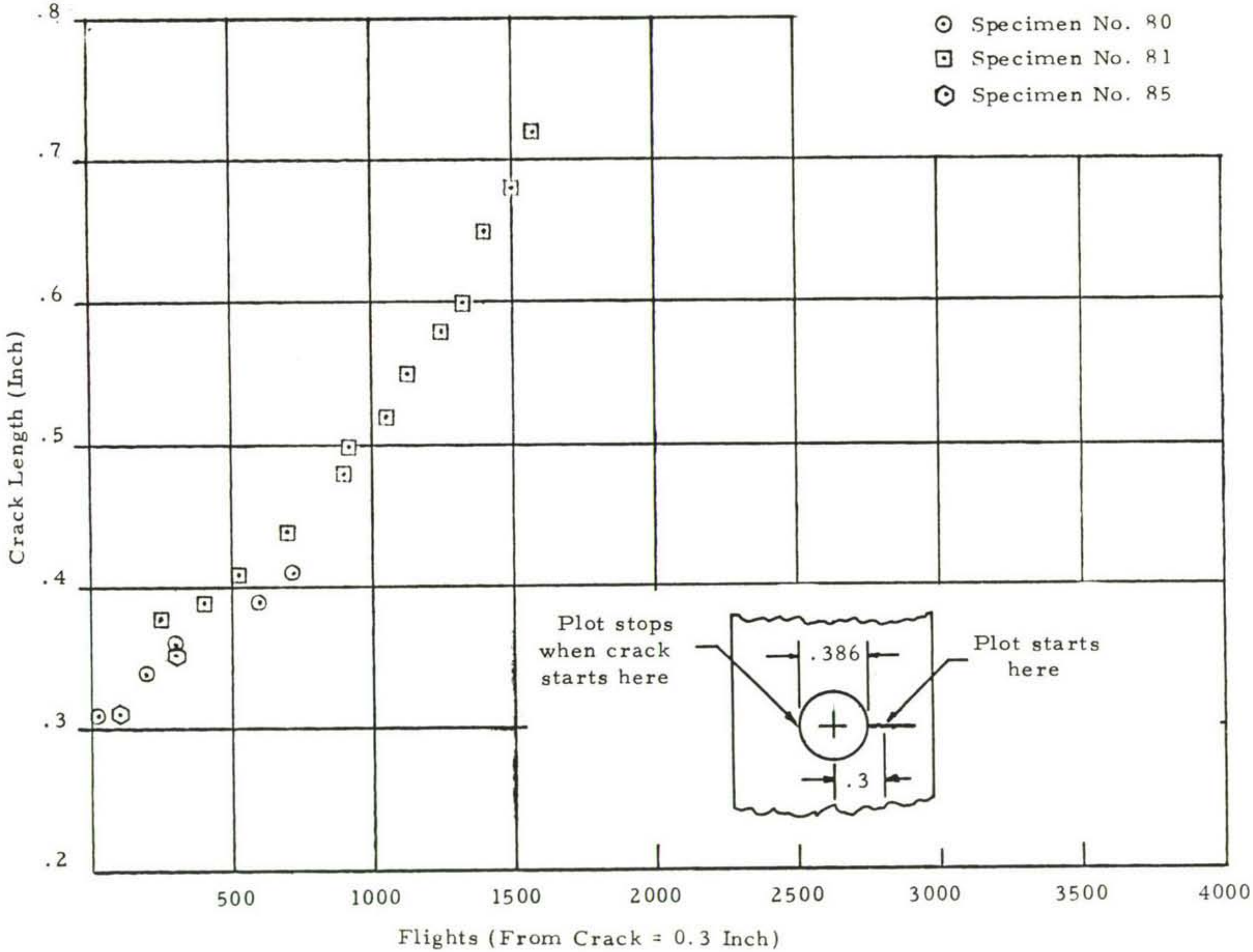


Figure 15. Crack Length vs Flights, F-106 Sequence E Bivariate Mean and Alternating Simulation.

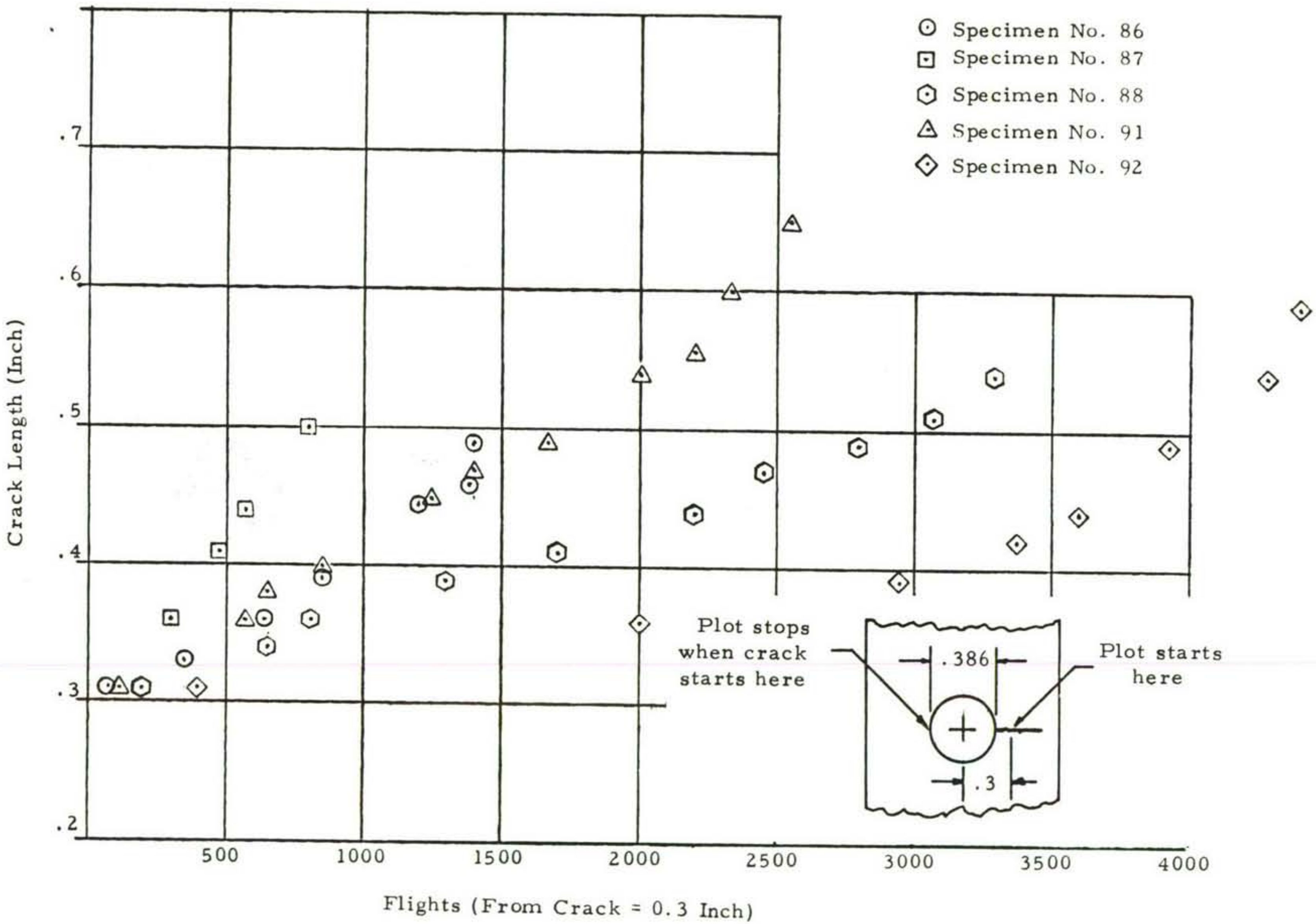


Figure 16. Crack Length vs Flights, F-106 Sequence E Separate Peak and Valley Simulation.

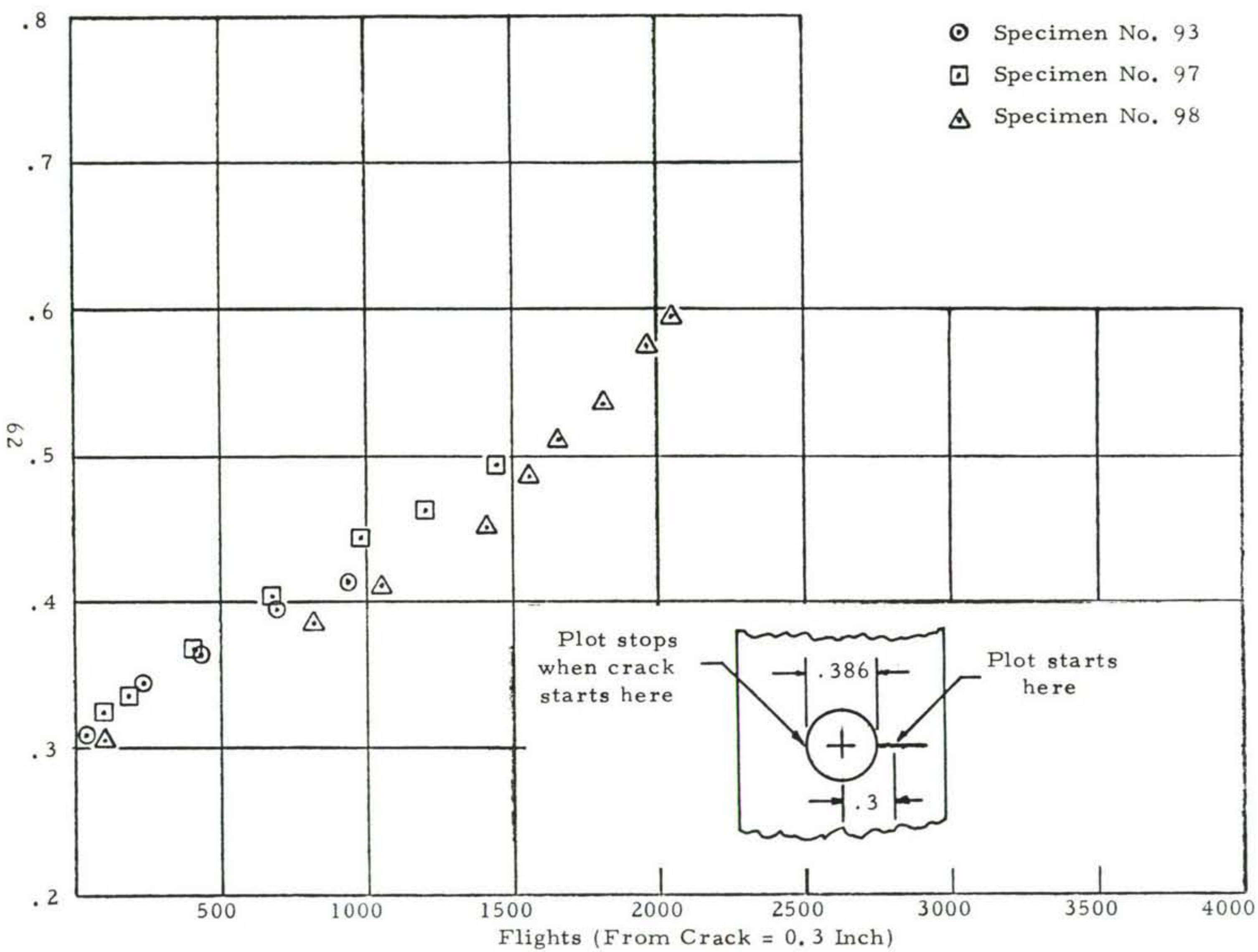


Figure 17. Crack Length vs Flight, F106 Sequence E Separate Peak and Valley Simulation.

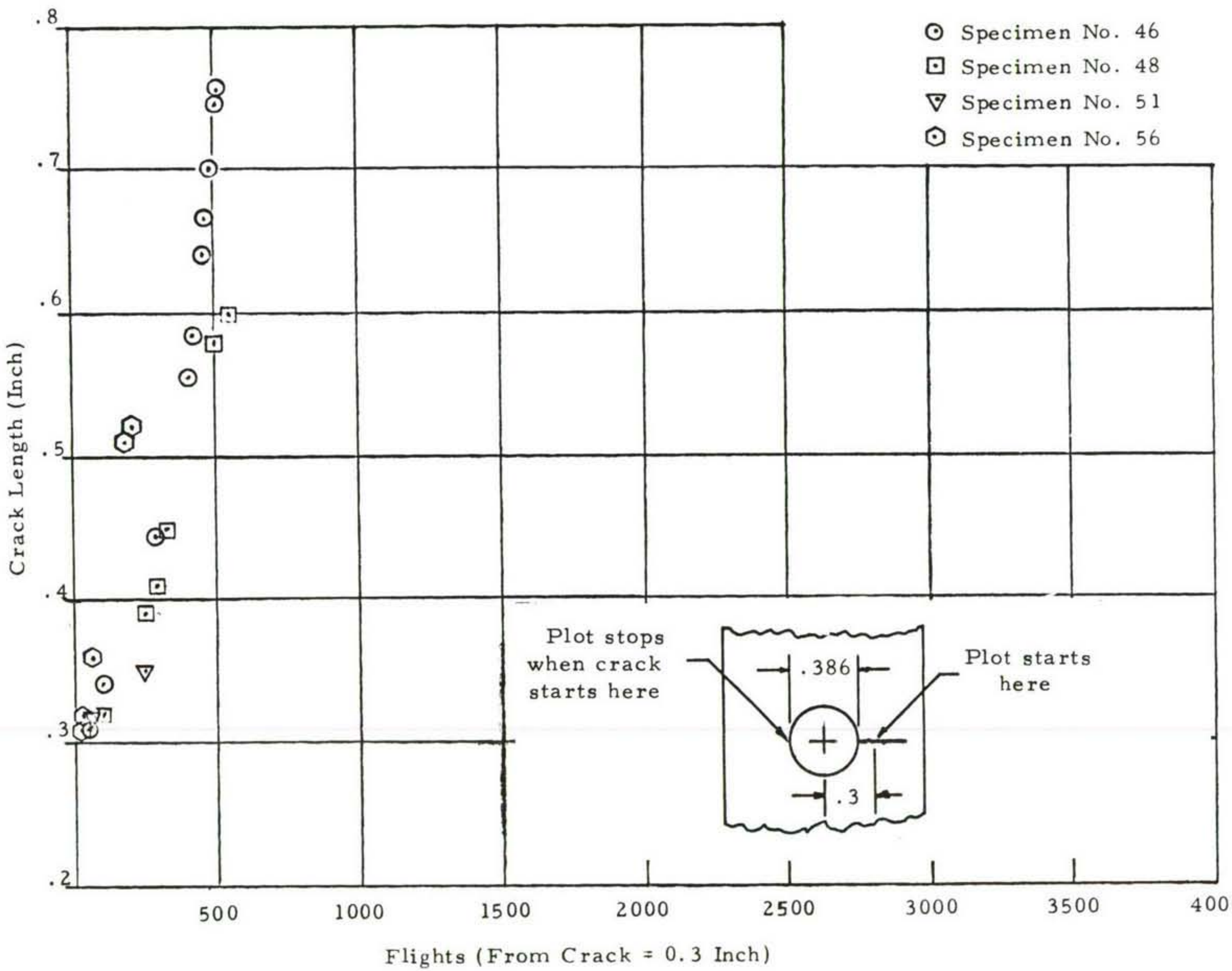


Figure 18. Crack Length vs Flights, F-106 Sequence F Original Data.

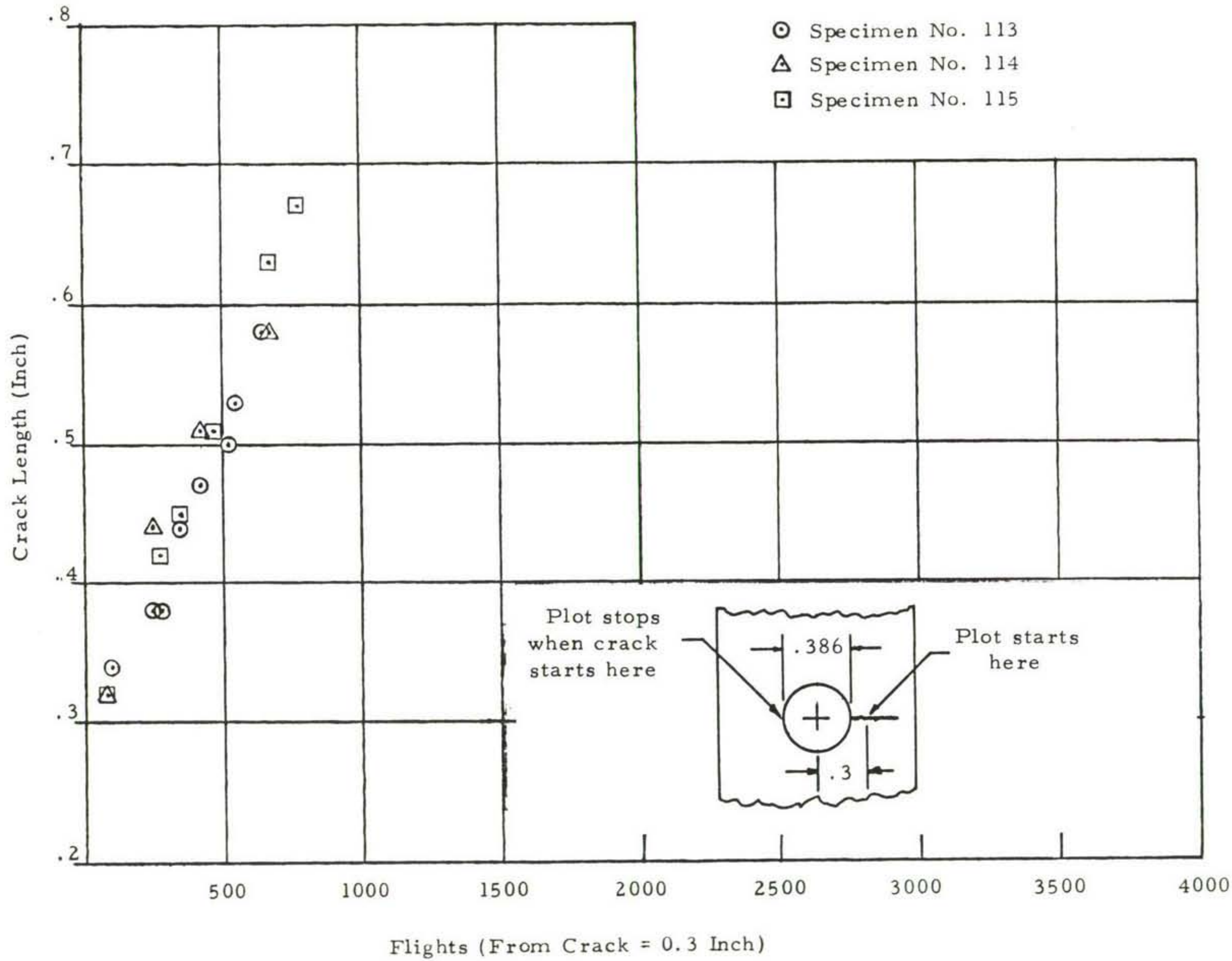


Figure 19 Crack Length vs Flights, F-106 Sequence F Separate Peak and Valley Simulation.

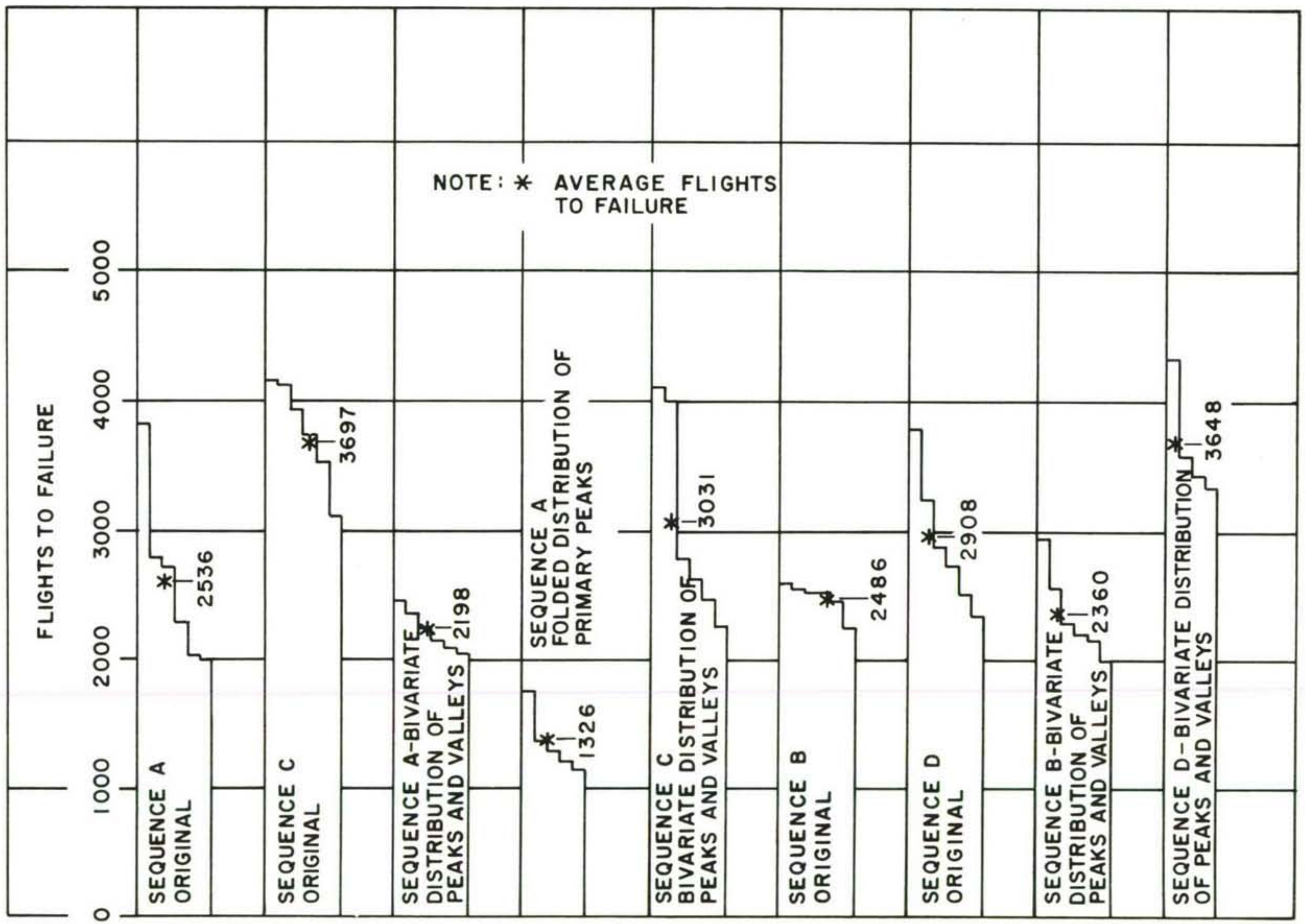


Figure 20. Test Results for All B-58 Data Sets. (Each level represents one specimen.)

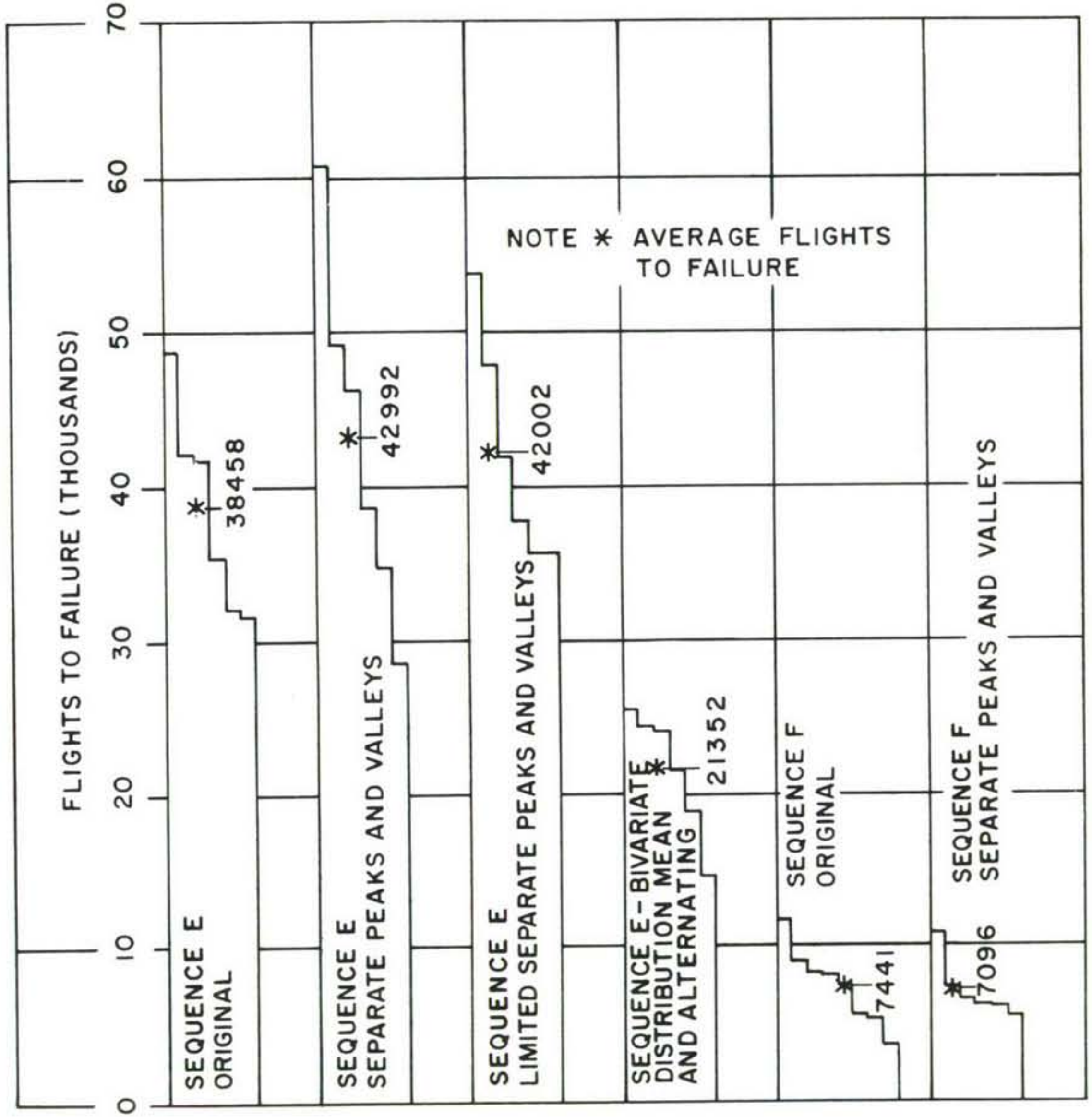
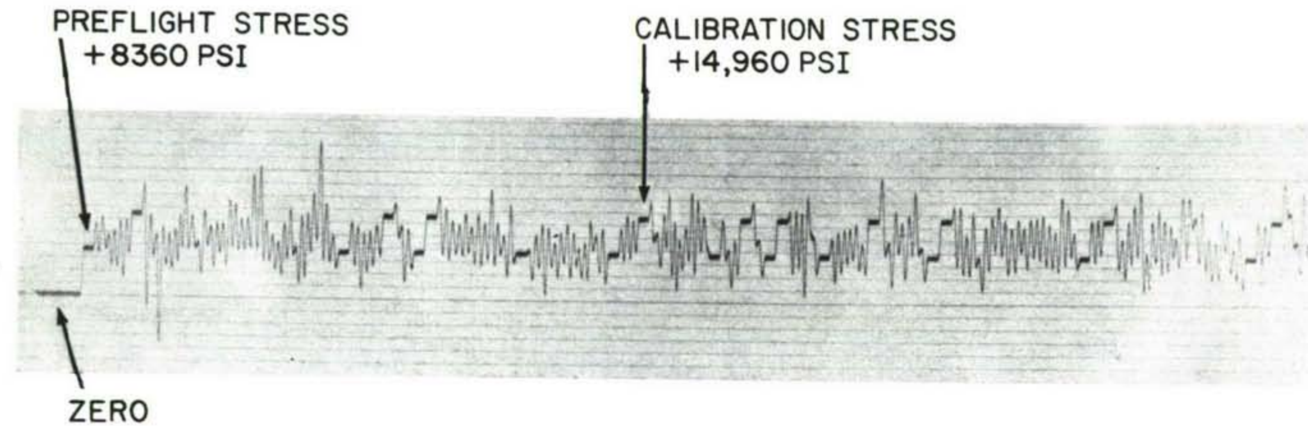
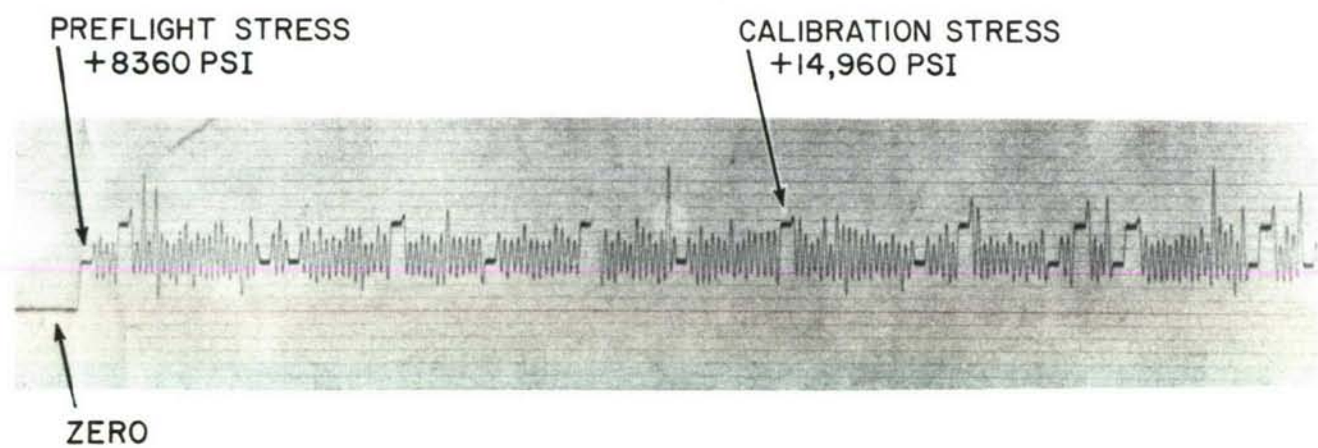


Figure 21. Test Results for All F-106 Data Sets. (Each level represents on specimen.)



(a) F106 Sequence E Bivariate Mean and Alternating Stress Simulation



(b) F106 Sequence E Separate Peak and Valley Simulation

Figure 22. Pictorial Comparison of Time Histories of F-106 Simulations.

TABLE 1

SUMMARY OF LOAD SEQUENCE FOR B-58 DATA
ORIGINAL STRAIN GAGE DATA

	SEQUENCE A Low Intensity 343 flights	SEQUENCE B High Intensity 282 flights
PRIMARY PEAKS		
Airborne Data		
No. of Peaks	190,438	80,727
Mean (psi)	12,905	14,780
Variance $(psi)^2$	33.2×10^6	41.8×10^6
Ground Data		
No. of Peaks	3849	2896
Mean (psi)	-8047	-8232
Variance $(psi)^2$	43.2×10^6	46.9×10^6
WEIGHTED 1-g FLIGHT STRESS		
Airborne Data		
No. of Peaks	193,255	82,895
Mean (psi)	12,920	14,690
Variance $(psi)^2$	12.1×10^6	17.6×10^6
Ground Data		
No. of Peaks	4193	3226
Mean (psi)	-6640	-6373
PREFLIGHT STRESS		
Mean (psi)	-8647	-8729
Variance $(psi)^2$	4.3×10^4	2.5×10^4
Mean of the No. of Airborne Primary Peaks Per Flight	555.21	286.27
Variance of Above	43.6×10^4	11.2×10^4
Mean of the No. of Ground Primary Peaks Per Flight	11.21	10.31
Variance of Above	447.5	69.7

TABLE 2

SUMMARY OF LOAD SEQUENCE FOR F-106 DATA
ORIGINAL STRAIN GAGE DATA

	SEQUENCE E Low Intensity	SEQUENCE F High Intensity
Number of Flights	381	236
Total No. of Stress Reversals	52,128	39,752
Airborne Primary Peaks	48,446	32,636
Variance of Primary Peaks	$11.18(ksi)^2$	$28.20(ksi)^2$
Stress Reversals (Ground Operations)	666	652
1-g Trim Stress (Constant)	8360psi	8360psi

TABLE 3
SPECIMEN ASSIGNMENT CHART

Specimen No. *	Specimen Location Code **	Specimen No. *	Specimen Location Code **	Specimen No. *	Specimen Location Code **
1	C 4-11	34	D 4-4	67	C 7-4
2	C 12-6	35	D 4-11	68	D 3-5
3	C 6-3	36	D 1-7	69	D 1-4
4	C 10-9	37	C 8-9	70	C 6-5
5	C 9-10	38	C 4-6	71	D 2-10
6	D 1-1	39	C 2-3	72	C 11-2
7	C 1-3	40	C 12-7	73	C 7-10
8	D 3-6	41	C 5-1	74	D 2-4
9	C 7-7	42	C 12-2	75	C 11-7
10	C 5-3	43	C 2-8	76	D 2-9
11	C 1-10	44	C 1-1	77	C 5-9
12	C 1-2	45	C 2-7	78	C 7-3
13	C 11-3	46	C 3-11	79	C 3-9
14	D 3-8	47	C 5-4	80	C 9-6
15	C 11-1	48	D 2-3	81	C 12-10
16	C 9-5	49	D 1-10	82	D 2-5
17	C 1-8	50	C 3-6	83	C 3-7
18	C 10-7	51	C 9-4	84	C 1-5
19	C 3-8	52	C 11-6	85	C 1-9
20	C 12-4	53	C 8-8	86	C 10-6
21	C 8-1	54	D 2-2	87	C 1-4
22	C 11-9	55	C 3-1	88	C 6-6
23	D 3-3	56	D 3-9	89	C 10-11
24	C 6-1	57	C 3-2	90	C 7-5
25	C 7-1	58	C 2-4	91	C 7-9
26	D 4-9	59	D 3-1	92	C 3-5
27	D 3-10	60	C 3-10	93	D 1-3
28	D 4-10	61	C 6-2	94	C 9-8
29	C 7-6	62	C 6-7	95	C 4-4
30	C 8-7	63	C 2-5	96	C 2-10
31	C 11-8	64	C 7-2	97	C 9-2
32	C 10-3	65	C 8-5	98	C 11-11
33	C 4-2	66	C 7-11	99	C 12-3

* Refers to specimen number in Test Plan.
** Plate number - row - column.

TABLE 3 (Continued)

Specimen No. *	Specimen Location Code **	Specimen No. *	Specimen Location Code **	Specimen No. *	Specimen Location Code **
100	C 1-6	126	D 3-4	152	C 4-5
101	C 11-4	127	C 10-2	153	C 9-1
102	C 4-10	128	C 5-10	154	D 4-5
103	C 5-7	129	C 12-9	155	C 2-1
104	C 9-9	130	D 3-7	156	D 1-6
105	C 5-11	131	C 6-8	157	C 6-4
106	C 9-11	132	C 10-5	158	C 12-1
107	C 4-3	133	C 11-5	159	C 6-9
108	C 10-4	134	C 2-2	160	C 8-11
109	C 4-9	135	C 5-8	161	C 11-10
110	C 12-8	136	C 9-3	162	C 3-4
111	D 4-2	137	C 12-11	163	C 4-8
112	D 2-7	138	C 8-4	164	D 4-3
113	D 1-9	139	C 10-10	165	C 2-11
114	C 5-5	140	D 3-2	166	D 1-8
115	D 1-11	141	C 3-3	167	D 4-8
116	D 4-7	142	C 8-10	168	C 4-1
117	C 9-7	143	C 8-3	169	C 1-7
118	C 1-11	144	C 10-8	170	D 2-1
119	D 1-2	145	D 3-11	171	D 2-11
120	D 2-6	146	C 5-6	172	C 8-6
121	C 6-10	147	C 5-2	173	C 12-5
122	C 4-7	148	C 7-8	174	C 8-2
123	C 6-11	149	C 2-9	175	D 4-6
124	D 2-8	150	D 4-1	176	C 2-6
125	C 10-1	151	D 1-5		

* Refers to specimen number in Test Plan.
** Plate number - row - column.

TABLE 4

Determination of Static Tensile Properties for 7075-T651 Bare Plate Specimen Material

Specimen Number	Width (in)	Thickness (in)	Maximum Load (lbs)	Yield Strength @ 0.2% (psi)	Ultimate Strength (psi)	Modulus of Elast. (x 10^6 psi)	Total Elongation (%)
C-1-3	0.2498	0.2483	5050	75,000	81,400	9.97	17.3
C-2-6	0.2498	0.2495	5150	76,200	82,600	9.82	17.3
D-2-3	0.2507	0.2488	5100	75,400	81,800	10.6	20.0
C-4-11	0.2501	0.2483	5050	74,900	81,300	9.20	18.7
D-3-10	0.2505	0.2491	5100	75,300	81,700	8.74	20.0
C-6-3	0.2505	0.2493	5125	75,300	82,100	9.15	18.7
D-1-1	0.2508	0.2484	5075	75,400	81,500	10.4	20.0
C-9-5	0.2503	0.2480	5200	77,300	83,800	9.20	18.7
D-3-6	0.2505	0.2495	5200	76,800	83,200	9.60	17.3
C-12-6	0.2494	0.2493	5125	75,600	82,400	9.36	16.0
C-11-1	0.2490	0.2482	5025	75,200	81,300	11.2	20.0
C-10-9	0.2506	0.2490	5025	73,700	80,500	9.61	18.7
C-7-7	0.2500	0.2489	5050	76,300	81,200	10.1	17.3
C-3-8	0.2503	0.2490	5125	75,400	82,200	10.1	17.3
Average				75,600	81,900	9.79	18.4

TABLE 5

CUMULATIVE FREQUENCY DISTRIBUTIONS FOR B-58 SEQUENCE A INCREMENTAL STRESS PEAKS

TYPE OF SIMULATION METHOD USED = 1 WHERE 1 - FOLDED DISTRIBUTIONS
2 - POSITIVE AND NEGATIVE DISTRIBUTIONS
3 - LIMITED FOLDED DISTRIBUTION
4 - RANGE COUNT DISTRIBUTION

NUMBER OF ENTRIES IN EACH TYPE OF DISTRIBUTION:

GROUND DATA				AIRBORNE DATA			
TABLE NUMBER 1		TABLE NUMBER 2		TABLE NUMBER 3		TABLE NUMBER 4	
14		14		15		15	
VALUE	FREQ.	VALUE	FREQ.	VALUE	FREQ.	VALUE	FREQ.
-3000.	559	3000.	379	-3000.	26226	3000.	28341
-4000.	240	4000.	428	-4000.	25570	4000.	22859
-5000.	137	5000.	255	-5000.	15684	5000.	13976
-6000.	96	6000.	131	-6000.	7573	6000.	6959
-7000.	67	7000.	46	-7000.	3182	7000.	3238
-8000.	44	8000.	21	-8000.	1274	8000.	1393
-9000.	41	9000.	12	-9000.	521	9000.	722
-10000.	49	10000.	10	-10000.	327	10000.	477
-12000.	30	12000.	1	-12000.	60	12000.	94
-14000.	10	14000.	1	-14000.	15	14000.	40
-16000.	9	16000.	3	-16000.	6	16000.	20
-18000.	4	18000.	0	-18000.	9	18000.	8
-20000.	6	20000.	1	-20000.	6	20000.	8
-25000.	0	25000.	0	-25000.	0	25000.	4
-0.	-0	-0.	-0	-30000.	0	30000.	0
0.	0	0.	0	0.	0	0.	0
0.	0	0.	0	0.	0	0.	0
0.	0	0.	0	0.	0	0.	0
0.	0	0.	0	0.	0	0.	0
0.	0	0.	0	0.	0	0.	0
0.	0	0.	0	0.	0	0.	0
0.	0	0.	0	0.	0	0.	0
0.	0	0.	0	0.	0	0.	0
0.	0	0.	0	0.	0	0.	0
0.	0	0.	0	0.	0	0.	0
0.	0	0.	0	0.	0	0.	0
0.	0	0.	0	0.	0	0.	0
0.	0	0.	0	0.	0	0.	0
0.	0	0.	0	0.	0	0.	0
0.	0	0.	0	0.	0	0.	0

TABLE 6

CUMULATIVE PROBABILITY FOR POSITIVE GROUND PEAK DISTRIBUTION DATA
B-58 SEQUENCE A

VALUE	FREQ DIST	CUM DIST	PROBABILITY
3000.	938	2580.	1.00000000
4000.	668	1642.	.63643411
5000.	392	974.	.37751938
6000.	227	582.	.22558140
7000.	113	355.	.13759690
8000.	65	242.	.09379845
9000.	53	177.	.06860465
10000.	59	124.	.04806202
12000.	31	65.	.02519380
14000.	11	34.	.01317829
16000.	12	23.	.00891473
18000.	4	11.	.00426357
20000.	7	7.	.00271318
25000.	0	0.	0.00000000

TABLE 7

CUMULATIVE PROBABILITY FOR POSITIVE AIRBORNE PEAK DISTRIBUTION DATA
B-58 SEQUENCE A

VALUE	FREQ DIST	CUM DIST	PROBABILITY
3000.	54567	158592.	1.00000000
4000.	48429	104025.	.65592842
5000.	29660	55596.	.35055993
6000.	14532	25936.	.16353914
7000.	6420	11404.	.07190779
8000.	2667	4984.	.03142655
9000.	1243	2317.	.01460982
10000.	804	1074.	.00677209
12000.	154	270.	.00170248
14000.	55	116.	.00073144
16000.	26	61.	.00038463
18000.	17	35.	.00022069
20000.	14	18.	.00011350
25000.	4	4.	.00002522
30000.	0	0.	0.00000000

TABLE 8

CUMULATIVE PROBABILITY FOR PREFLIGHT STRESS DISTRIBUTION DATA
B-58 SEQUENCE A

VALUE	FREQ DIST	CUM DIST	PROBABILITY
-8950.	1	343.	1.00000000
-8900.	13	342.	.99708455
-8850.	27	329.	.95918367
-8800.	52	302.	.88046647
-8750.	47	250.	.72886297
-8700.	46	203.	.59183673
-8650.	52	157.	.45772595
-8600.	31	105.	.30612245
-8550.	17	74.	.21574344
-8500.	14	57.	.16618076
-8450.	9	43.	.12536443
-8400.	6	34.	.09912536
-8350.	2	28.	.08163265
-8300.	1	26.	.07580175
-8250.	2	25.	.07288630
-8200.	1	23.	.06705539
-8150.	1	22.	.06413994
-8100.	15	21.	.06122449
-8000.	3	6.	.01749271
-7800.	1	3.	.00874636
-7600.	2	2.	.00583090
-7400.	0	0.	0.00000000

TABLE 9

CUMULATIVE PROBABILITY FOR GROUND 1-G STRESS DISTRIBUTION DATA
B-58 SEQUENCE A

VALUE	FREQ DIST	CUM DIST	PROBABILITY
-13000.	13	313.*	1.00000000
-12000.	35	300.	.95846645
-11000.	25	265.	.84664537
-10500.	28	240.	.76677316
-10000.	18	212.	.67731629
-9500.	20	194.	.61980831
-9000.	13	174.	.55591054
-8500.	15	161.	.51437700
-8000.	17	146.	.46645367
-7500.	7	129.	.41214058
-7000.	9	122.	.38977636
-6500.	11	113.	.36102236
-6000.	12	102.	.32587859
-5500.	7	90.	.28753994
-5000.	7	83.	.26517572
-4500.	13	76.	.24281150
-4000.	7	63.	.20127796
-3500.	7	56.	.17891374
-3000.	9	49.	.15654952
-2500.	7	40.	.12779553
-2000.	8	33.	.10543131
-1000.	11	25.	.07987220
0.	5	14.	.04472843
1000.	9	9.	.02875399
2000.	0	0.	0.00000000

*30 flights did not have any cyclic stresses.

TABLE 10

CUMULATIVE PROBABILITY FOR NUMBER OF GROUND PEAKS PER FLIGHT DATA
B-58 SEQUENCE A

VALUE	FREQ DIST	CUM DIST	PROBABILITY
0.	30	343.	1.00000000
1.	36	313.	.91253644
2.	41	277.	.80758017
3.	31	236.	.68804665
4.	38	205.	.59766764
5.	20	167.	.48688047
6.	32	147.	.42857143
7.	16	115.	.33527697
8.	24	99.	.28862974
9.	19	75.	.21865889
10.	8	56.	.16326531
11.	7	48.	.13994169
12.	6	41.	.11953353
13.	6	35.	.10204082
14.	1	29.	.08454810
15.	4	28.	.08163265
16.	6	24.	.06997085
17.	2	18.	.05247813
18.	3	16.	.04664723
19.	1	13.	.03790087
20.	1	12.	.03498542
21.	5	11.	.03206997
26.	3	6.	.01749271
101.	2	3.	.00874636
201.	1	1.	.00291545
301.	0	0.	0.00000000

TABLE 11

CUMULATIVE PROBABILITY FOR AIRBORNE 1-G STRESS DISTRIBUTION DATA
B-58 SEQUENCE A

VALUE	FREQ DIST	CUM DIST	PROBABILITY
4000.	3	342.*	1.00000000
5000.	1	339.	.99122807
6000.	4	338.	.98830409
7000.	4	334.	.97660819
8000.	11	330.	.96491228
9000.	16	319.	.93274854
10000.	19	303.	.88596491
10500.	25	284.	.83040936
11000.	24	259.	.75730994
11500.	15	235.	.68713450
12000.	16	220.	.64327485
12500.	27	204.	.59649123
13000.	16	177.	.51754386
13500.	29	161.	.47076023
14000.	17	132.	.38596491
14500.	18	115.	.33625731
15000.	17	97.	.28362573
15500.	16	80.	.23391813
16000.	11	64.	.18713450
16500.	7	53.	.15497076
17000.	7	46.	.13450292
17500.	7	39.	.11403509
18000.	18	32.	.09356725
19000.	8	14.	.04093567
20000.	4	6.	.01754386
21000.	2	2.	.00584795
25000.	0	0.	0.00000000

*One flight did not have any cyclic stresses.

TABLE 12

CUMULATIVE PROBABILITY FOR NUMBER OF AIRBORNE PEAKS PER FLIGHT DATA
B-58 SEQUENCE A

VALUE	FREQ DIST	CUM DIST	PROBABILITY
1.	18	342.*	1.00000000
26.	25	324.	.94736842
51.	25	299.	.87426901
76.	22	274.	.80116959
101.	23	252.	.73684211
126.	21	229.	.66959064
151.	10	208.	.60818713
176.	16	198.	.57894737
201.	11	182.	.53216374
226.	10	171.	.50000000
251.	12	161.	.47076023
276.	7	149.	.43567251
301.	8	142.	.41520468
326.	7	134.	.39181287
351.	11	127.	.37134503
401.	9	116.	.33918129
451.	6	107.	.31286550
501.	11	101.	.29532164
601.	9	90.	.26315789
701.	12	81.	.23684211
801.	12	69.	.20175439
901.	5	57.	.16666667
1001.	6	52.	.15204678
1126.	4	46.	.13450292
1251.	15	42.	.12280702
1501.	7	27.	.07894737
1751.	10	20.	.05847953
2001.	7	10.	.02923977
2251.	2	3.	.00877193
2501.	1	1.	.00292398
3001.	0	0.	0.00000000

*One flight did not have any cyclic stresses.

TABLE 13

SIMULATION PROGRAM RUN ON 05/16/74 AT 20.11.12. SUMMARY OF FLIGHTS ON CHANNEL 1 - B-58 SEQUENCE A FOLDED DISTRIBUTION

		GROUND DATA						AIRBORNE DATA						TOTAL	CUMULATIVE	
FLT ID	PREFLT STRESS	NUM PEAKS	1.0 G STRESS	MEAN	VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	1.0 G STRESS	MEAN	VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	NUM PEAKS	NUM POINTS
1001	-8640.	6	-8352.	-7322.	.5339E+08	-15000.	4477.	142	13185.	13185.	.2513E+08	3436.	22935.	148	148	168
1002	-8803.	4	-12148.	-11092.	.2261E+08	-15000.	-5349.	80	14111.	14111.	.2404E+08	7373.	20849.	84	232	264
1003	-8739.	0	0.	0.	0.	0.	0.	1804	13735.	13734.	.2510E+08	-5093.	30000.	1804	2036	2080
1004	-8649.	8	-5135.	-5135.	.2056E+08	-10869.	598.	172	11236.	11236.	.2481E+08	2606.	19865.	180	2216	2272
1005	-8433.	8	-10720.	-8728.	.6140E+08	-15000.	6765.	740	9124.	9124.	.2523E+08	-1730.	19978.	748	2964	3032
1006	-8735.	0	0.	0.	0.	0.	0.	316	18758.	18747.	.2579E+08	4088.	30000.	316	3280	3360
1007	-8900.	10	-9095.	-9017.	.2538E+08	-15000.	-2789.	222	11942.	11942.	.2499E+08	191.	23693.	232	3512	3604
1008	-8640.	2	-4327.	-4327.	.3675E+08	-8614.	-40.	554	11188.	11188.	.2709E+08	-543.	22920.	556	4068	4172
1009	-8633.	4	1627.	1627.	.3234E+08	-4452.	7705.	1276	12472.	12472.	.2566E+08	-2307.	27251.	1280	5348	5464
1010	-8611.	4	-6975.	-6975.	.2487E+08	-11839.	-2112.	70	13716.	13716.	.2485E+08	1914.	25518.	74	5422	5550
1011	-7982.	6	409.	409.	.4844E+08	-7590.	8408.	260	8861.	8861.	.2406E+08	-1983.	19706.	266	5688	5828
1012	-8527.	2	1794.	1794.	.4092E+08	-2729.	6317.	306	10841.	10841.	.2475E+08	1278.	20404.	308	5996	6148
1013	-8560.	12	-10251.	-9984.	.1963E+08	-15000.	-2297.	586	20378.	20359.	.2582E+08	5760.	30000.	598	6594	6758
1014	-7586.	0	0.	0.	0.	0.	0.	158	12792.	12745.	.2833E+08	-11862.	30000.	158	6752	6928
1015	-8677.	10	-10578.	-9825.	.3017E+08	-15000.	-3558.	162	17298.	17248.	.2671E+08	-3497.	30000.	172	6924	7112
1016	-8632.	2	-9650.	-5408.	.1840E+09	-15000.	4183.	274	12474.	12474.	.2420E+08	3024.	21924.	276	7200	7400
1017	-8598.	16	-10963.	-10310.	.2461E+08	-15000.	-746.	1806	12716.	12715.	.2557E+08	-5986.	30000.	1822	9022	9234
1018	-8630.	14	-6304.	-6304.	.2641E+08	-12233.	-375.	670	15874.	15874.	.2609E+08	4563.	27186.	684	9706	9930
1019	-8634.	12	-11244.	-10107.	.2758E+08	-15000.	-2265.	134	10868.	10868.	.2483E+08	1576.	20160.	146	9852	10088
1020	-8479.	24	-1524.	-1524.	.2711E+08	-12233.	9186.	296	12895.	12895.	.2396E+08	4391.	21400.	320	10172	10420
1021	-8605.	2	-10553.	-10553.	.2268E+08	-13921.	-7186.	168	19567.	19567.	.2441E+08	11341.	27793.	170	10342	10602
1022	-8486.	2	-246.	-246.	.8795E+08	-6878.	6385.	178	12565.	12565.	.2099E+08	4724.	20406.	180	10522	10794
1023	-7452.	0	0.	0.	0.	0.	0.	828	15974.	15974.	.2562E+08	4508.	27439.	828	11350	11634
1024	-8747.	2	-11548.	-10424.	.4188E+08	-15000.	-5848.	120	12573.	12573.	.2899E+08	2620.	22526.	122	11472	11768
1025	-8712.	4	-11276.	-10705.	.2385E+08	-15000.	-5266.	50	10450.	10450.	.2798E+08	1883.	19016.	54	11526	11834
1026	-8749.	6	-9895.	-9895.	.2290E+08	-14633.	-5157.	18	15398.	15398.	.3661E+08	6781.	24015.	24	11550	11870
1027	-8419.	4	-4939.	-3173.	.1464E+09	-15000.	12185.	304	11561.	11561.	.2434E+08	-51.	23172.	308	11858	12190
1028	-8894.	8	-9346.	-8655.	.3987E+08	-15000.	1839.	920	10428.	10428.	.2569E+08	-1183.	22040.	928	12786	13130
1029	-8763.	4	1023.	1023.	.4672E+08	-6061.	8107.	362	14017.	14017.	.2515E+08	4747.	23288.	366	13152	13508
1030	-8578.	0	0.	0.	0.	0.	0.	222	16370.	16370.	.2728E+08	3542.	29198.	222	13374	13742
1031	-8594.	10	-3327.	-3327.	.3604E+08	-12075.	5421.	278	10639.	10639.	.2507E+08	1549.	19730.	288	13662	14042
1032	-8552.	6	-10542.	-9563.	.3551E+08	-15000.	-2046.	890	7263.	7263.	.2349E+08	-4087.	18613.	896	14558	14950
1033	-8835.	0	0.	0.	0.	0.	0.	188	13094.	13094.	.2887E+08	2124.	24065.	188	14746	15150
1034	-8793.	8	-5546.	-5546.	.4223E+08	-13638.	2546.	80	6450.	6450.	.2511E+08	-4358.	17258.	88	14834	15250
1035	-8645.	10	-12390.	-11768.	.1178E+08	-15000.	-7802.	1492	7563.	7563.	.2480E+08	-5272.	20398.	1502	16336	16764
1036	-8477.	0	0.	0.	0.	0.	0.	64	14594.	14594.	.2422E+08	6740.	22448.	64	16400	16840
1037	-8780.	2	-3372.	-194.	.4384E+09	-15000.	14612.	1948	16563.	16561.	.2484E+08	577.	30000.	1950	18350	18802
1038	-8612.	2	-8722.	-8722.	.3296E+08	-12782.	-4662.	64	9106.	9106.	.2245E+08	-853.	19065.	66	18416	18880
1039	-8710.	4	-12582.	-10957.	.2180E+08	-15000.	-6880.	978	12194.	12194.	.2423E+08	443.	23944.	982	19398	19874
1040	-8772.	8	-9197.	-7861.	.5685E+08	-15000.	7293.	838	11302.	11302.	.2505E+08	465.	22139.	846	20244	20732
1041	-8535.	4	-2641.	-2641.	.1737E+08	-6567.	1284.	64	13295.	13295.	.2468E+08	5505.	21085.	68	20312	20812
1042	-8760.	22	-2326.	-2268.	.4349E+08	-15000.	11633.	440	13876.	13876.	.2298E+08	2116.	25636.	462	20774	21286
1043	-8616.	2	-9613.	-9613.	.1951E+08	-12737.	-6490.	202	12312.	12312.	.2444E+08	3042.	21583.	204	20978	21502
1044	-8574.	8	-5881.	-5881.	.2794E+08	-13078.	1316.	2	15482.	15482.	.1706E+09	6247.	24718.	10	20988	21524
1045	-8542.	2	-401.	-401.	.2469E+08	-3915.	3113.	48	16504.	16504.	.2544E+08	6884.	26124.	50	21038	21586
1046	-8679.	10	-6454.	-6424.	.3886E+08	-15000.	2397.	440	8359.	8359.	.2566E+08	-4255.	20973.	450	21488	22048
1047	-8769.	2	-7732.	-7732.	.3118E+08	-11680.	-3783.	114	11357.	11357.	.2843E+08	1498.	21215.	116	21604	22176
1048	-8735.	0	0.	0.	0.	0.	0.	18	10504.	10504.	.3174E+08	2674.	18333.	18	21622	22206
1049	-8039.	6	-344.	-344.	.4016E+08	-7761.	7872.	60	10194.	10194.	.2328E+08	2420.	17968.	66	21688	22284
1050	-8587.	12	-10119.	-9528.	.3149E+08	-15000.	314.	104	10932.	10932.	.2433E+08	2229.	19636.	116	21804	22412

TABLE 14

SUMMARY OF DATA ON EACH CHANNEL
B-58 SEQUENCE A FOLDED DISTRIBUTION

					GROUND DATA						AIRBORNE DATA					
CHAN NO.	NUM REC	NO. OF PEAKS	NO. OF POINTS	NUM FLTS	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE
1	2576	211302	216358	420	20069.	-15000.	2464	-7120.	.4094E+08	.2765E+08	30000.	-14123.	208838	13424.	.3753E+08	.2526E+08
2	2573	210786	216070	439	16565.	-15000.	2696	-7061.	.3923E+08	.2886E+08	30000.	-15000.	208090	13515.	.3306E+08	.2512E+08
3	2573	210606	216130	459	21156.	-15000.	2730	-7287.	.3907E+08	.2844E+08	30000.	-15000.	207876	14159.	.3483E+08	.2524E+08
TOT	7722	632694	648558	1318	21156.	-15000.	7890	-7157.	.3971E+08	.2833E+08	30000.	-15000.	624804	13699.	.3525E+08	.2521E+08

TABLE 15

LISTING OF PEAKS AND VALLEYS AT START OF 3 FM CHANNELS
B-58 SEQUENCE A FOLDED DISTRIBUTION

RECORD NO. 1

0	0	0	
0	0	0	
0	0	0	
0	0	0	
0	0	0	
0	0	0	
0	0	0	
0	0	0	
-1920	-1912	-1859	
-1920	-1912	-1859	Preflight stress
-1920	-1912	-1859	
-1920	-1912	-1859	
-916	-1022	-1553	1 ground cycle
-2796	-1022	-3200	
995	-1022	-1022	
-3333	-1022	-1022	Calibration = -4600 psi
-1014	1533	-1022	
-2698	1533	-1022	
-1022	1533	1533	
-1022	1533	1533	Calibration = +6900 psi
-1022	3777	1533	
-1022	1659	1533	
1533	3479	3204	1st airborne stress cycle
1533	1956	1307	
1533	4224	4872	2nd airborne stress cycle
1533	1211	-361	
5096	3826	3118	
763	1610	1393	
3990	4044	3363	
1869	1391	1148	
3697	3432	3401	Scaled Value
2163	2004	1110	
4190	4257	2931	+9999 = +45,000 psi
1670	1168	1580	-9999 = -45,000 psi
4197	3682	3044	
1662	1754	1467	
4019	4489	3336	
1841	947	1175	
3924	3667	3872	
1935	1769	639	
3982	4366	3067	
1877	1070	1444	
3877	3399	3179	
1982	2037	1332	
3807	3517	3301	
2052	1919	1210	
3789	3817	3296	
2070	1618	1215	
4405	3638	3153	
1455	1797	1358	
3832	3708	3146	
2028	1728	1365	
4316	4695	3047	
1543	740	1464	
4337	3988	3115	
1522	1447	1396	
4149	3900	3439	
1711	1536	1072	

TABLE 16

FREQUENCY DISTRIBUTION TABLE OF PEAK AND VALLEY STRESSES FOR GROUND DATA
B-58 SEQUENCE A

PEAK STRESS	VALLEY STRESS 0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	8000.	9000.	10000.	12000.	14000.	16000.	18000.	20000.	25000.	TOTAL
3000.	10	23	77	151	50	17	9	4	1	2	4	2	0	0	0	0	0	350
4000.	9	33	156	129	49	25	4	2	2	3	1	2	0	0	0	0	0	415
5000.	8	34	86	67	26	15	9	1	0	1	2	0	0	0	0	0	0	249
6000.	5	18	38	24	23	11	5	1	3	0	0	0	0	0	0	0	0	128
7000.	0	9	7	9	13	3	0	1	0	0	2	0	0	0	0	0	0	44
8000.	1	1	5	3	8	1	0	0	0	0	1	0	0	0	0	0	0	20
9000.	0	1	3	3	2	1	1	0	1	0	0	0	0	0	0	0	0	12
10000.	0	2	1	2	1	0	0	0	0	1	0	0	0	0	0	0	0	7
12000.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14000.	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
16000.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
18000.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	34	121	374	388	172	73	28	9	7	7	10	4	0	0	0	0	0	1227

TABLE 17

FREQUENCY DISTRIBUTION TABLE OF PEAK AND VALLEY STRESSES FOR AIRBORNE DATA
B-58 SEQUENCE A

PEAK STRESS	VALLEY STRESS 0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	8000.	9000.	10000.	12000.	14000.	16000.	18000.	20000.	25000.	TOTAL
3000.	4	42	1266	10752	9028	4342	1719	650	239	104	59	16	4	1	3	1	0	28230
4000.	8	285	3766	7614	5795	3139	1321	532	187	73	50	14	2	1	2	2	0	22791
5000.	77	1392	2625	3710	3010	1742	846	368	153	67	35	5	2	2	2	1	0	13947
6000.	406	935	1272	1463	1288	820	410	204	88	41	22	1	2	0	0	0	0	6952
7000.	321	453	558	625	524	368	190	109	47	23	13	4	1	0	0	0	0	3236
8000.	155	195	228	249	215	152	90	49	33	12	10	0	1	1	0	0	0	1390
9000.	84	114	122	116	97	84	54	20	10	10	9	0	1	0	0	0	0	721
10000.	68	75	77	71	65	55	35	14	7	3	3	1	0	0	1	0	0	475
12000.	16	13	15	10	17	9	8	4	0	0	1	1	0	0	0	0	0	94
14000.	8	8	5	8	5	1	4	1	0	0	0	0	0	0	0	0	0	40
16000.	3	2	9	2	1	0	1	0	1	0	0	1	0	0	0	0	0	20
18000.	2	1	3	2	0	2	0	0	0	0	0	0	0	0	0	0	0	10
20000.	3	1	3	2	0	0	1	0	0	0	0	0	0	0	0	0	0	10
25000.	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	4
30000.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1156	3426	9950	24625	20046	10714	4679	1951	765	333	202	43	13	5	8	4	0	77920

TABLE 18

CUMULATIVE PROBABILITY FOR PEAK STRESSES FOR GROUND BIVARIATE TABLE
B-58 SEQUENCE A

VALUE	FREQ DIST	CUM DIST	PROBABILITY
3000.	350	1227.	1.00000000
4000.	415	877.	.71475143
5000.	249	462.	.37652812
6000.	128	213.	.17359413
7000.	44	85.	.06927465
8000.	20	41.	.03341483
9000.	12	21	.01711491
10000.	7	9.	.00733496
12000.	0	2.	.00162999
14000.	1	2.	.00162999
16000.	1	1.	.00081500
18000.	0	0.	0.00000000

TABLE 19

CUMULATIVE PROBABILITY TABLE OF PEAK AND VALLEY STRESSES FOR GROUND DATA
B-58 SEQUENCE A

PEAK	VALLEY STRESS																
STRESS	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	8000.	9000.	10000.	12000.	14000.	16000.	18000.	20000.	25000.
3000.	1.0000	.9714	.9057	.6857	.2543	.1114	.0629	.0371	.0257	.0229	.0171	.0057	0.0000	0.0000	0.0000	0.0000	0.0000
4000.	1.0000	.9783	.8988	.5229	.2120	.0940	.0337	.0241	.0193	.0145	.0072	.0048	0.0000	0.0000	0.0000	0.0000	0.0000
5000.	1.0000	.9679	.8313	.4859	.2169	.1124	.0522	.0161	.0120	.0120	.0080	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6000.	1.0000	.9609	.8203	.5234	.3359	.1563	.0703	.0313	.0234	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7000.	1.0000	1.0000	.7955	.6364	.4318	.1364	.0682	.0682	.0455	.0455	.0455	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8000.	1.0000	.9500	.9000	.6500	.5000	.1000	.0500	.0500	.0500	.0500	.0500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9000.	1.0000	1.0000	.9167	.6667	.4167	.2500	.1667	.0833	.0833	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10000.	1.0000	1.0000	.7143	.5714	.2857	.1429	.1429	.1429	.1429	.1429	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12000.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14000.	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
16000.	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
18000.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

TABLE 20

CUMULATIVE PROBABILITY FOR PEAK STRESS FOR AIRBORNE BIVARIATE TABLE
B-58 SEQUENCE A

VALUE	FREQ DIST	CUM DIST	PROBABILITY
3000.	28230	77920.	1.00000000
4000.	22791	49690.	.63770534
5000.	13947	26899.	.34521304
6000.	6952	12952.	.16622177
7000.	3236	6000.	.07700205
8000.	1390	2764.	.03547228
9000.	721	1374.	.01763347
10000.	475	653.	.00838039
12000.	94	178.	.00228439
14000.	40	84.	.00107803
16000.	20	44.	.00056468
18000.	10	24.	.00030801
20000.	10	14.	.00017967
25000.	4	4.	.00005133
30000.	0	0.	0.00000000

TABLE 21

CUMULATIVE PROBABILITY TABLE OF PEAK AND VALLEY STRESSES FOR AIRBORNE DATA
B-58 SEQUENCE A

PEAK STRESS	VALLEY STRESS 0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	8000.	9000.	10000.	12000.	14000.	16000.	18000.	20000.	25000.
3000.	1.0000	.9999	.9994	.9535	.5727	.2529	.0990	.0382	.0151	.0067	.0035	.0009	.0003	.0002	.0001	.0000	0.0000
4000.	1.0000	.9996	.9871	.8219	.4878	.2336	.0958	.0379	.0145	.0063	.0031	.0009	.0003	.0002	.0002	.0001	0.0000
5000.	1.0000	.9945	.9011	.7129	.4469	.2311	.1062	.0455	.0191	.0082	.0034	.0009	.0005	.0004	.0002	.0001	0.0000
6000.	1.0000	.9416	.8071	.6241	.4137	.2284	.1105	.0515	.0222	.0095	.0036	.0004	.0003	0.0000	0.0000	0.0000	0.0000
7000.	1.0000	.9008	.7608	.5884	.3952	.2333	.1196	.0609	.0272	.0127	.0056	.0015	.0003	0.0000	0.0000	0.0000	0.0000
8000.	1.0000	.8885	.7482	.5842	.4050	.2504	.1410	.0753	.0410	.0173	.0086	.0014	.0014	.0007	0.0000	0.0000	0.0000
9000.	1.0000	.8835	.7254	.5562	.3953	.2607	.1442	.0693	.0416	.0277	.0139	.0014	.0014	0.0000	0.0000	0.0000	0.0000
10000.	1.0000	.8558	.6989	.5368	.3874	.2505	.1347	.0611	.0316	.0168	.0105	.0042	.0021	.0021	.0021	0.0000	0.0000
12000.	1.0000	.8298	.6915	.5319	.4255	.2447	.1489	.0638	.0213	.0213	.0213	.0106	0.0000	0.0000	0.0000	0.0000	0.0000
14000.	1.0000	.8000	.6000	.4750	.2750	.1500	.1250	.0250	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
16000.	1.0000	.8500	.7500	.3000	.2000	.1500	.1500	.1000	.1000	.0500	.0500	.0500	0.0000	0.0000	0.0000	0.0000	0.0000
18000.	1.0000	.8000	.7000	.4000	.2000	.2000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20000.	1.0000	.7000	.6000	.3000	.1000	.1000	.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25000.	1.0000	.7500	.7500	.5000	.2500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30000.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

TABLE 22

SIMULATION PROGRAM RUN ON 07/11/74 AT 18.52.49, SUMMARY OF FLIGHTS ON CHANNEL 4
BIVARIATE DISTRIBUTION OF POSITIVE AND NEGATIVE PRIMARY PEAKS
B-58 SEQUENCE A

		************* G R O U N D		D A T A ************				*********** A I R B O R N E		D A T A **********				TOTAL	CUMULATIVE	
FLT ID	PREFLT STRESS	NUM PEAKS	1.0 G STRESS	MEAN	VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	1.0 G STRESS	MEAN	VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	NUM PEAKS	NUM POINTS
4001	-8382.	4	-10013.	-9389.	.1609E+08	-14763.	-5926.	52	7716.	7766.	.2527E+08	685.	18168.	56	56	76
4002	-8418.	4	-8102.	-7547.	.1966E+08	-12376.	-3140.	844	11128.	11494.	.2339E+08	-463.	26812.	848	904	936
4003	-8360.	8	-9431.	-8701.	.1816E+08	-13187.	-4086.	108	18642.	18849.	.2275E+08	9948.	27543.	116	1020	1064
4004	-8455.	4	-239.	1405.	.1922E+08	-2528.	6113.	70	10647.	11141.	.2206E+08	2566.	20212.	74	1094	1150
4005	-8738.	8	-11180.	-10423.	.1564E+08	-14632.	-5841.	424	16482.	16827.	.2211E+08	7174.	28390.	432	1526	1594
4006	-8627.	0	0.	0.	0.	0.	0.	134	12420.	12900.	.2236E+08	5334.	23921.	134	1660	1740
4007	-8603.	0	0.	0.	0.	0.	0.	200	17918.	18256.	.2231E+08	9302.	29401.	200	1860	1952
4008	-8698.	8	-7696.	-7304.	.1407E+08	-12018.	-3282.	240	16144.	16391.	.1994E+08	9046.	25477.	248	2108	2212
4009	-8505.	24	-2801.	-2104.	.1424E+08	-6729.	3006.	376	8557.	8923.	.2162E+08	-3564.	18937.	400	2508	2624
4010	-8765.	4	-5621.	-5031.	.3084E+08	-10371.	-213.	730	14552.	14883.	.2116E+08	6279.	27422.	734	3242	3370
4011	-8824.	2	-6623.	-6521.	.2576E+08	-10109.	-2932.	38	13735.	13674.	.2799E+08	2559.	20555.	40	3282	3422
4012	-8685.	0	0.	0.	0.	0.	0.	1006	11237.	11528.	.2188E+08	271.	22832.	1006	4288	4440
4013	-8562.	0	0.	0.	0.	0.	0.	444	15763.	16110.	.2180E+08	7472.	25422.	444	4732	4895
4014	-8717.	14	-10511.	-9374.	.2026E+08	-15000.	-3522.	96	16269.	16760.	.2159E+08	9194.	24799.	110	4842	5018
4015	-8330.	2	-5588.	-6696.	.1379E+09	-15000.	1607.	58	11112.	11430.	.2183E+08	3552.	22547.	60	4902	5090
4016	-8645.	6	-6150.	-5947.	.3254E+08	-15000.	-236.	1716	12787.	13085.	.2281E+08	-1301.	24525.	1722	6624	6824
4017	-8532.	4	-5226.	-4709.	.1567E+08	-8859.	-1046.	42	9973.	10372.	.1928E+08	3888.	19515.	46	6670	6882
4018	-8786.	8	-3918.	-3631.	.2006E+08	-8339.	2198.	884	13471.	13854.	.2288E+08	628.	30000.	892	7562	7785
4019	-8821.	0	0.	0.	0.	0.	0.	178	14503.	14592.	.2218E+08	6579.	24835.	178	7740	7976
4020	-8736.	18	-9408.	-8267.	.2190E+08	-14841.	-1463.	128	13292.	13511.	.2517E+08	5545.	22232.	146	7886	8134
4021	-8601.	4	-10418.	-9738.	.1377E+08	-13174.	-6062.	1390	14206.	14595.	.2273E+08	-2309.	27599.	1394	9280	9540
4022	-8679.	14	-10108.	-9327.	.2015E+08	-15000.	-3821.	190	11866.	12195.	.2211E+08	3584.	20517.	204	9484	9756
4023	-8700.	0	0.	0.	0.	0.	0.	92	11694.	11880.	.2132E+08	4433.	18509.	92	9576	9860
4024	-8698.	14	-8010.	-7699.	.2067E+08	-15000.	-2256.	180	14105.	14535.	.2208E+08	5993.	23791.	194	9770	10065
4025	-8753.	0	0.	0.	0.	0.	0.	244	11622.	11718.	.2166E+08	101.	21479.	244	10014	10322
4026	-8840.	2	-11952.	-11687.	.2196E+08	-15000.	-8373.	324	15273.	15567.	.2216E+08	4544.	26649.	326	10340	10660
4027	-8849.	0	0.	0.	0.	0.	0.	230	12104.	12361.	.2181E+08	4199.	23429.	230	10570	10902
4028	-8047.	0	0.	0.	0.	0.	0.	58	12229.	12721.	.2147E+08	5306.	19806.	58	10628	10972
4029	-8600.	6	-11878.	-10138.	.1912E+08	-14694.	-5236.	132	19561.	20064.	.2358E+08	11815.	30000.	138	10766	11122
4030	-8815.	24	-5391.	-4176.	.1872E+08	-9762.	5803.	96	18792.	18864.	.2358E+08	11464.	30000.	120	10886	11254
4031	-8810.	0	0.	0.	0.	0.	0.	64	15693.	15962.	.2394E+08	7635.	24270.	64	10950	11330
4032	-8685.	8	-2285.	-1974.	.2485E+08	-8329.	4970.	72	14200.	14663.	.2637E+08	6236.	25022.	80	11030	11422
4033	-8586.	4	-11835.	-9840.	.2061E+08	-14633.	-4975.	286	13634.	14125.	.2285E+08	2112.	26665.	290	11320	11724
4034	-8747.	2	-10050.	-7778.	.6410E+08	-13439.	-2116.	144	18321.	18541.	.2274E+08	6729.	28850.	146	11466	11882
4035	-8687.	2	-10485.	-8291.	.4421E+08	-12993.	-3589.	1852	12773.	13076.	.2224E+08	915.	29904.	1854	13320	13748
4036	-8587.	4	-8810.	-8010.	.1980E+08	-12233.	-3846.	140	8134.	8217.	.2020E+08	975.	16868.	144	13464	13904
4037	-8604.	2	-10053.	-9933.	.3338E+08	-14019.	-5848.	2264	14824.	15214.	.2262E+08	-329.	29811.	2266	15730	16182
4038	-8717.	8	-4106.	-3283.	.2251E+08	-9556.	2293.	108	15400.	15921.	.2453E+08	7339.	30000.	116	15846	16310
4039	-8929.	0	0.	0.	0.	0.	0.	780	19970.	20287.	.2262E+08	10074.	30000.	780	16626	17102
4040	-8733.	0	0.	0.	0.	0.	0.	1298	13211.	13499.	.2228E+08	1183.	25678.	1298	17924	18412
4041	-8207.	4	-6256.	-3950.	.4314E+08	-9868.	3361.	188	13927.	14209.	.2154E+08	4098.	23388.	192	18116	18616
4042	-8597.	0	0.	0.	0.	0.	0.	0	0.	0.	0.	0.	0.	0	18116	18628
4043	-8722.	2	-3662.	-3286.	.4293E+08	-7919.	1347.	62	11473.	11386.	.2513E+08	557.	21835.	64	18180	18704
4044	-8680.	4	-10094.	-9829.	.2917E+08	-15000.	-4498.	204	13968.	14370.	.2117E+08	6118.	23319.	208	18388	18924
4045	-8610.	10	-2335.	-2114.	.1835E+08	-7225.	3963.	202	11241.	11683.	.2192E+08	2960.	25160.	212	18600	19149
4046	-8659.	4	-9067.	-8489.	.2086E+08	-13000.	-4454.	10	11411.	12032.	.2311E+08	5517.	18128.	14	18614	19174
4047	-8823.	4	-6186.	-6101.	.1795E+08	-10081.	-1818.	48	13449.	13614.	.1958E+08	7640.	20838.	52	18666	19238
4048	-8604.	2	-6335.	-5100.	.2237E+08	-8445.	-1755.	40	21212.	21549.	.2021E+08	14686.	29418.	42	18708	19292
4049	-8619.	6	-3356.	-2079.	.2272E+08	-8030.	2804.	794	10513.	10793.	.2267E+08	-648.	24278.	800	19508	20104
4050	-8834.	4	-7837.	-7295.	.2490E+08	-11700.	-1771.	1632	14876.	15216.	.2231E+08	4740.	27162.	1636	21144	21752

TABLE 23

SUMMARY OF DATA ON EACH CHANNEL
BIVARIATE DISTRIBUTION OF POSITIVE AND NEGATIVE PRIMARY PEAKS
B-58 SEQUENCE A

					GROUND DATA						AIRBORNE DATA					
CHAN NO.	NUM REC	NO. OF PEAKS	NO. OF POINTS	NUM FLTS	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE
4	2593	212230	217778	461	11194.	-15000.	3200	-6657.	.2968E+08	.1870E+08	30000.	-13008.	209030	13642.	.3125E+08	.2248E+08
5	2572	210136	216032	490	14491.	-15000.	3086	-6622.	.3293E+08	.1925E+08	30000.	-11736.	207050	13601.	.3258E+08	.2253E+08
6	2575	210818	216246	451	11309.	-15000.	2770	-6792.	.3075E+08	.1876E+08	30000.	-12262.	208048	13966.	.3518E+08	.2242E+08
TOT	7740	633184	650056	1402	14491.	-15000.	9056	-6686.	.3076E+08	.1890E+08	30000.	-13008.	624128	13736.	.3303E+08	.2248E+08

TABLE 24

LISTING OF PEAKS AND VALLEYS AT START OF 3 FM CHANNELS
BIVARIATE DISTRIBUTION OF POSITIVE AND NEGATIVE PRIMARY PEAKS
B-58 SEQUENCE A

STEP 1 OF SIMULATION RUN COMPLETE - NEXT STEP COMBINES DATA FROM EACH CHANNEL ONTO TAPE 2

RECORD NO. 1

0	0	0	
0	0	0	
0	0	0	
0	0	0	
0	0	0	ground cycles
0	0	0	
0	0	0	
0	0	0	
-1863	-1934	-1958	
-1863	-1934	-1958	preflight stress
-1863	-1934	-1958	
-1863	-1934	-1958	
-1503	364	-1022	no ground cycles this flight
-3280	-869	-1022	
-1317	598	-1022	calibration = -4600 psi
-2245	-1381	-1022	
-1022	710	1533	
-1022	-1143	1533	calibration = +6900 psi
-1022	439	1533	
-1022	-1357	1533	
1533	-1022	3055	
1533	-1022	1352	
1533	-1022	2994	
1533	-1022	566	
2668	1533	2957	
936	1533	1056	
2905	1533	3388	
774	1533	1310	
2384	4768	3191	
780	3006	1179	
2491	4624	2908	
362	1975	1144	
4037	4741	2949	
545	2848	1152	
2440	4327	3390	
585	2737	1091	
3432	4319	3088	
372	2763	-223	
3417	4620	3299	
1202	2745	1149	
2981	4612	2823	
734	2569	929	
2410	4477	3180	
1041	2514	1071	
2560	5179	2922	
408	2918	1390	
2516	4494	3367	
943	2689	1654	
2733	4195	3020	
1119	2424	1609	
2706	4334	3658	
213	2607	1578	
2483	4907	3045	
770	3517	1278	
2396	4390	2928	
491	2190	1713	
3490	4260	2821	
152	2744	1327	
2623	4265	3115	

TABLE 25

CUMULATIVE PROBABILITY FOR POSITIVE GROUND PEAK DISTRIBUTION DATA
B-58 SEQUENCE A LIMITED FOLDED DISTRIBUTION

VALUE	FREQ DIST	CUM DIST	PROBABILITY
3000.	938	2580.	1.00000000
4000.	668	1642.	.63643411
5000.	392	974.	.37751938
6000.	227	582.	.22558140
7000.	113	355.	.13759690
8000.	65	242.	.09379845
9000.	53	177.	.06860465
10000.	59	124.	.04806202
12000.	31	65.	.02519380
14000.	11	34.	.01317829
16000.	12	23.	.00891473
18000.	4	11.	.00426357
20000.	7	7.	.00271318
25000.	0	0.	0.00000000

TABLE 26

CUMULATIVE PROBABILITY FOR POSITIVE AIRBORNE PEAK DISTRIBUTION DATA
B-58 SEQUENCE A LIMITED FOLDED DISTRIBUTION

VALUE	FREQ DIST	CUM DIST	PROBABILITY
3000.	54567	158592.	1.00000000
4000.	48429	104025.	.65592842
5000.	29660	55596.	.35055993
6000.	14532	25936.	.16353914
7000.	6420	11404.	.07190779
8000.	2667	4984.	.03142655
9000.	1243	2317.	.01460982
10000.	804	1074.	.00677209
12000.	154	270.	.00170248
14000.	55	116.	.00073144
16000.	26	61.	.00038463
18000.	17	35.	.00022069
20000.	14	18.	.00011350
25000.	4	4.	.00002522
30000.	0	0.	0.00000000

TABLE 27

CUMULATIVE PROBABILITY FOR NUMBER OF GROUND PEAKS PER FLIGHT DATA
B-58 SEQUENCE A LIMITED FOLDED DISTRIBUTION

VALUE	FREQ DIST	CUM-DIST	PROBABILITY
0.	66	343.	1.00000000
4.	162	277.	.80758017
8.	59	115.	.33527697
12.	45	56.	.16326531
78.	11	11.	.03206997
144.	0	0.	0.00000000

TABLE 28

CUMULATIVE PROBABILITY FOR NUMBER OF AIRBORNE PEAKS PER FLIGHT DATA
B-58 SEQUENCE A LIMITED FOLDED DISTRIBUTION

VALUE	FREQ DIST	CUM DIST	PROBABILITY
75.	134	342.	1.00000000
239.	81	208.	.60818713
455.	37	127.	.37134503
784.	38	90.	.26315789
1620.	52	52.	.15204678
2456.	0	0.	0.00000000

TABLE 29

CUMULATIVE PROBABILITY FOR GROUND 1-G STRESS DISTRIBUTION DATA
B-58 SEQUENCE A LIMITED FOLDED DISTRIBUTION

VALUE	FREQ DIST	CUM DIST	PROBABILITY
-11100.	101	313.	1.00000000
-9060.	66	212.	.67731629
-6800.	56	146.	.46645367
-4250.	41	90.	.28753994
-630.	49	49.	.15654952
2990.	0	0.	0.00000000

TABLE 30

CUMULATIVE PROBABILITY FOR AIRBORNE 1-G STRESS DISTRIBUTION DATA
B-58 SEQUENCE A LIMITED FOLDED DISTRIBUTION

VALUE	FREQ DIST	CUM DIST	PROBABILITY
8220.	39	342.	1.00000000
10960.	83	303.	.88596491
12750.	59	220.	.64327485
15040.	122	161.	.47076023
19000.	39	39.	.11403509
22960.	0	0.	0.00000000

TABLE 31

CUMULATIVE PROBABILITY FOR PREFLIGHT STRESS DISTRIBUTION DATA
B-58 SEQUENCE A LIMITED FOLDED DISTRIBUTION

VALUE	FREQ DIST	CUM DIST	PROBABILITY
-8780.	140	343.	1.00000000
-8590.	175	203.	.59183673
-8030.	28	28.	.08163265
-7470.	0	0.	0.00000000

TABLE 32

SIMULATION PROGRAM RUN ON 05/16/74 AT 20.29.19, SUMMARY OF FLIGHTS ON CHANNEL 7
B-58 SEQUENCE A LIMITED FOLDED DISTRIBUTION

		************ G R O U N D		D A T A ************				************ A I R B O R N E		D A T A ************				TOTAL	CUMULATIVE	
FLT ID	PREFLT STRESS	NUM PEAKS	1.0 G STRESS	MEAN	VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	1.0 G STRESS	MEAN	VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	NUM PEAKS	NUM POINTS
7001	-8780.	0	0.	0.	0.	0.	0.	74	10960.	10960.	.3073E+08	-1508.	20412.	74	74	94
7002	-8780.	8	-11100.	-10958.	.1702E+08	-15000.	-6288.	1620	10960.	10960.	.2463E+08	-1613.	23533.	1628	1702	1734
7003	-8590.	0	0.	0.	0.	0.	0.	1620	10960.	10960.	.2521E+08	-3437.	25357.	1620	3322	3366
7004	-8780.	8	-6800.	-6479.	.4816E+08	-15000.	3971.	74	19000.	19000.	.2596E+08	9304.	28696.	82	3404	3460
7005	-8590.	8	-4250.	-4250.	.3616E+08	-13597.	5097.	1620	15040.	15040.	.2474E+08	3668.	26412.	1628	5032	5100
7006	-8590.	4	-11100.	-10875.	.2274E+08	-15000.	-6469.	238	12750.	12750.	.2573E+08	983.	24517.	242	5274	5354
7007	-8030.	4	-9060.	-9060.	.2160E+08	-13377.	-4743.	74	15040.	15040.	.2569E+08	7046.	23034.	78	5352	5444
7008	-8590.	4	-11100.	-10493.	.2716E+08	-15000.	-5641.	454	15040.	15040.	.2374E+08	2890.	27190.	458	5810	5914
7009	-8780.	0	0.	0.	0.	0.	0.	784	15040.	15024.	.2833E+08	-9326.	30000.	784	6594	6710
7010	-8590.	4	-630.	-630.	.6678E+08	-9577.	8317.	238	19000.	19000.	.2544E+08	9245.	28755.	242	6836	6964
7011	-8780.	78	-630.	-630.	.2907E+08	-13053.	11793.	74	15040.	15040.	.2587E+08	6193.	23887.	152	6988	7128
7012	-8590.	4	-11100.	-9987.	.3524E+08	-15000.	-3358.	74	15040.	15040.	.2312E+08	6443.	23637.	78	7066	7218
7013	-8590.	4	-6800.	-6800.	.1657E+08	-10603.	-2997.	238	12750.	12750.	.2757E+08	334.	25166.	242	7308	7472
7014	-8590.	4	-630.	-630.	.5335E+08	-7475.	6215.	74	15040.	15040.	.2320E+08	7845.	22235.	78	7386	7562
7015	-8030.	4	-9060.	-9060.	.2156E+08	-13129.	-4991.	74	15040.	15040.	.2187E+08	7594.	22486.	78	7464	7652
7016	-8780.	4	-11100.	-10434.	.2875E+08	-15000.	-4676.	238	12750.	12750.	.2356E+08	2633.	22867.	242	7706	7906
7017	-8030.	8	-630.	-630.	.3250E+08	-6803.	5543.	238	8220.	8220.	.2571E+08	-2514.	18954.	246	7952	8164
7018	-8590.	4	-9060.	-9060.	.1924E+08	-12927.	-5193.	454	10960.	10960.	.2533E+08	-1026.	22946.	458	8410	8634
7019	-8590.	0	0.	0.	0.	0.	0.	238	15040.	15040.	.2466E+08	5861.	24219.	238	8648	8884
7020	-8590.	0	0.	0.	0.	0.	0.	238	10960.	10960.	.2314E+08	-734.	22654.	238	8886	9134
7021	-8590.	12	-11100.	-10926.	.1649E+08	-15000.	-6236.	1620	15040.	15040.	.2478E+08	-2587.	27493.	1632	10518	10778
7022	-8030.	12	-9060.	-9047.	.1983E+08	-15000.	-2967.	238	12750.	12750.	.2413E+08	2315.	23185.	250	10768	11040
7023	-8590.	0	0.	0.	0.	0.	0.	74	15040.	15040.	.2675E+08	6975.	23105.	74	10842	11126
7024	-8590.	8	-9060.	-8529.	.3501E+08	-15000.	273.	238	10960.	10960.	.2501E+08	2565.	19355.	246	11088	11384
7025	-8590.	4	-9060.	-9034.	.3288E+08	-15000.	-3017.	454	19000.	19000.	.2375E+08	9178.	28822.	458	11546	11854
7026	-8780.	4	-4250.	-2801.	.1393E+09	-15000.	12295.	238	19000.	19000.	.2513E+08	10232.	27768.	242	11788	12108
7027	-8590.	0	0.	0.	0.	0.	0.	1620	12750.	12750.	.2557E+08	1032.	24468.	1620	13408	13740
7028	-8030.	4	-9060.	-9060.	.1507E+08	-12513.	-5607.	238	15040.	15040.	.2513E+08	6222.	23858.	242	13650	13994
7029	-8780.	4	-11100.	-10923.	.2222E+08	-15000.	-6554.	784	15040.	15040.	.2415E+08	3885.	26195.	788	14438	14794
7030	-8590.	8	-11100.	-10635.	.2188E+08	-15000.	-5638.	1620	10960.	10960.	.2454E+08	-2799.	24719.	1628	16066	16434
7031	-8590.	4	-11100.	-11100.	.1695E+08	-14878.	-7322.	454	10960.	10960.	.2463E+08	-984.	22904.	458	16524	16904
7032	-8590.	8	-9060.	-9060.	.2102E+08	-14706.	-3414.	238	8220.	8220.	.2468E+08	-435.	16875.	246	16770	17162
7033	-8590.	4	-630.	-630.	.2380E+08	-5062.	3802.	1620	10960.	10960.	.2542E+08	-4274.	26194.	1624	18394	18798
7034	-8590.	8	-6800.	-6800.	.3297E+08	-13645.	45.	238	12750.	12750.	.2686E+08	-2135.	27635.	246	18640	19056
7035	-8780.	8	-9060.	-9060.	.1448E+08	-12780.	-5340.	74	10960.	10960.	.2519E+08	1077.	20843.	82	18722	19150
7036	-8590.	4	-4250.	-4250.	.2392E+08	-8834.	334.	74	19000.	19000.	.2899E+08	11008.	26992.	78	18800	19240
7037	-8780.	4	-11100.	-11100.	.1769E+08	-14916.	-7284.	238	12750.	12750.	.2626E+08	2762.	22738.	242	19042	19494
7038	-8590.	4	-11100.	-10976.	.2144E+08	-15000.	-6706.	1620	12750.	12750.	.2558E+08	-589.	26089.	1624	20666	21130
7039	-8030.	4	-11100.	-10118.	.3198E+08	-15000.	-4680.	238	12750.	12750.	.2573E+08	1005.	24495.	242	20908	21384
7040	-8590.	0	0.	0.	0.	0.	0.	238	19000.	19000.	.2321E+08	9298.	28702.	238	21146	21634
7041	-8590.	0	0.	0.	0.	0.	0.	74	15040.	15040.	.3133E+08	3104.	26976.	74	21220	21720
7042	-8780.	8	-11100.	-10619.	.2015E+08	-15000.	-5270.	74	15040.	15040.	.2733E+08	4052.	26028.	82	21302	21814
7043	-8590.	8	-11100.	-10136.	.2748E+08	-15000.	-3963.	238	10960.	10960.	.2653E+08	-569.	22489.	246	21548	22072
7044	-8780.	8	-9060.	-8887.	.3516E+08	-15000.	-1736.	238	19000.	18999.	.2404E+08	7675.	30000.	246	21794	22330
7045	-8590.	78	-630.	-630.	.3076E+08	-11738.	10478.	238	15040.	15040.	.2692E+08	5440.	24640.	316	22110	22658
7046	-8590.	12	-11100.	-9369.	.5425E+08	-15000.	10004.	74	8220.	8220.	.2178E+08	781.	15659.	86	22196	22756
7047	-8590.	4	-11100.	-9490.	.4611E+08	-15000.	-759.	1620	15040.	15040.	.2540E+08	557.	29523.	1624	23820	24392
7048	-8590.	4	-6800.	-6800.	.2454E+08	-11970.	-1630.	1620	15040.	15039.	.2611E+08	-1023.	30030.	1624	25444	26028
7049	-8780.	8	-11100.	-10867.	.1928E+08	-15000.	-5738.	74	15040.	15040.	.2374E+08	8087.	21993.	82	25526	26122
7050	-8590.	8	-4250.	-4250.	.4162E+08	-11048.	2548.	74	15040.	15040.	.2853E+08	3705.	26375.	82	25608	26216

TABLE 33

CUMULATIVE PROBABILITY FOR NUMBER OF GROUND CYCLES PER FLIGHT
F-106 SEQUENCE E BIVARIATE DISTRIBUTION OF MEAN AND ALTERNATING STRESSES

VALUE	FREQ DIST	CUM DIST	PROBABILITY
0.	322	381.	1.00000000
1.	53	59.	.15485564
2.	5	6.	.01574803
3.	1	1.	.00262467
4.	0	0.	0.00000000

TABLE 34

CUMULATIVE PROBABILITY FOR NUMBER OF AIRBORNE CYCLES PER FLIGHT
F-106 SEQUENCE E BIVARIATE DISTRIBUTION OF MEAN AND ALTERNATING STRESSES

VALUE	FREQ DIST	CUM DIST	PROBABILITY
1.	34	381.	1.00000000
5.	42	347.	.91076115
10.	57	305.	.80052493
15.	42	248.	.65091864
20.	35	206.	.54068241
25.	31	171.	.44881890
30.	31	140.	.36745407
35.	25	109.	.28608924
40.	18	84.	.22047244
45.	15	66.	.17322835
50.	8	51.	.13385827
55.	10	43.	.11286089
60.	10	33.	.08661417
65.	4	23.	.06036745
70.	4	19.	.04986877
75.	1	15.	.03937008
80.	1	14.	.03674541
90.	1	13.	.03412073
100.	5	12.	.03149606
120.	2	7.	.01837270
140.	2	5.	.01312336
160.	1	3.	.00787402
180.	2	2.	.00524934
225.	0	0.	0.00000000

TABLE 35

CUMULATIVE PROBABILITY FOR MEAN STRESSES FOR GROUND BIVARIATE TABLE
F-106 SEQUENCE E BIVARIATE DISTRIBUTION OF MEAN AND ALTERNATING STRESSES

VALUE	FREQ DIST	CUM DIST	PROBABILITY
0.	4	66.	1.00000000
2000.	4	62.	.93939394
4000.	1	58.	.87878788
6000.	4	57.	.86363636
8000.	19	53.	.80303030
10000.	25	34.	.51515152
12000.	7	9.	.13636364
14000.	1	2.	.03030303
16000.	0	1.	.01515152
18000.	1	1.	.01515152
20000.	0	0.	0.00000000

TABLE 36

CUMULATIVE PROBABILITY TABLE OF MEAN AND ALTERNATING STRESSES FOR GROUND DATA
F-106 SEQUENCE E BIVARIATE DISTRIBUTION OF MEAN AND ALTERNATING STRESSES

MEAN	ALTERNATING STRESS																
STRESS	2500.	3000.	3500.	4000.	4500.	5000.	5500.	6000.	6500.	7000.	7500.	8000.	8500.	9000.	9500.	10000.	11000.
0.	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	.7500	.5000	.5000	.2500	0.0000	0.0000	0.0000
2000.	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	.7500	.7500	.7500	.7500	.7500	.7500	.7500	.5000	0.0000
4000.	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6000.	1.0000	.7500	.5000	.2500	.2500	.2500	.2500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8000.	1.0000	.4737	.2105	.0526	.0526	.0526	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10000.	1.0000	.7200	.6000	.3200	.1200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12000.	1.0000	1.0000	.8571	.7143	.5714	.4286	.1429	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14000.	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
16000.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
18000.	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20000.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

TABLE 37

CUMULATIVE PROBABILITY FOR MEAN STRESS FOR AIRBORNE BIVARIATE TABLE
F-106 SEQUENCE E BIVARIATE DISTRIBUTION OF MEAN AND ALTERNATING STRESSES

VALUE	FREQ DIST	CUM DIST	PROBABILITY
0.	1	10864.	1.00000000
2000.	6	10863.	.99990795
4000.	92	10857.	.99935567
6000.	1040	10765.	.99088733
8000.	3789	9725.	.89515832
10000.	3674	5936.	.54639175
12000.	1293	2262.	.20821060
14000.	530	969.	.08919367
16000.	239	439.	.04040869
18000.	104	200.	.01840943
20000.	57	96.	.00883652
22000.	22	39.	.00358984
24000.	9	17.	.00156480
26000.	8	8.	.00073638
28000.	0	0.	0.00000000

TABLE 38

CUMULATIVE PROBABILITY TABLE OF MEAN AND ALTERNATING STRESS FOR AIRBORNE DATA
F-106 SEQUENCE E BIVARIATE DISTRIBUTION OF MEAN AND ALTERNATING STRESSES

MEAN STRESS	ALTERNATING STRESS 2500.	3000.	3500.	4000.	4500.	5000.	5500.	6000.	6500.	7000.	7500.	8000.	8500.	9000.	9500.	10000.	11000.	12000.
0.	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000
2000.	1.0000	.8333	.8333	.6667	.3333	.3333	.3333	.1667	.1667	.1667	.1667	.1667	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4000.	1.0000	.6522	.3696	.3043	.1848	.1304	.0435	.0326	.0326	.0217	.0217	.0109	.0109	0.0000	0.0000	0.0000	0.0000	0.0000
6000.	1.0000	.5212	.3029	.1683	.0952	.0558	.0327	.0173	.0115	.0077	.0077	.0058	.0029	.0019	.0010	0.0000	0.0000	0.0000
8000.	1.0000	.4814	.2520	.1333	.0763	.0391	.0222	.0132	.0079	.0061	.0037	.0026	.0016	.0011	.0011	.0011	.0003	0.0000
10000.	1.0000	.6274	.4213	.2730	.1668	.1018	.0536	.0348	.0188	.0120	.0068	.0033	.0016	.0005	0.0000	0.0000	0.0000	0.0000
12000.	1.0000	.8190	.6883	.5561	.4393	.3233	.2243	.1524	.1013	.0626	.0425	.0263	.0162	.0070	.0039	.0008	0.0000	0.0000
14000.	1.0000	.8962	.8000	.7264	.6509	.5811	.5057	.4358	.3547	.2774	.2019	.1377	.0830	.0585	.0340	.0189	.0113	.0019
16000.	1.0000	.8870	.8159	.7233	.6904	.6276	.5941	.5649	.5021	.4393	.3640	.2678	.1925	.1506	.1088	.0837	.0251	.0167
18000.	1.0000	.3654	.7885	.6442	.5769	.5288	.5192	.4808	.4615	.4231	.4135	.4038	.3846	.3558	.3365	.2981	.1635	0.0000
20000.	1.0000	.3245	.6140	.5083	.4561	.4035	.3158	.2632	.2281	.1930	.1404	.1053	.0702	.0526	.0175	0.0000	0.0000	0.0000
22000.	1.0000	.7727	.5455	.3636	.2727	.2727	.2727	.1818	.1818	.1364	.0909	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24000.	1.0000	.8889	.5556	.4444	.4444	.3333	.2222	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
26000.	1.0000	.7500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
28000.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MEAN STRESS	ALTERNATING STRESS 13000.	14000.
0.	0.0000	0.0000
2000.	0.0000	0.0000
4000.	0.0000	0.0000
6000.	0.0000	0.0000
8000.	0.0000	0.0000
10000.	0.0000	0.0000
12000.	0.0000	0.0000
14000.	.0019	0.0000
16000.	0.0000	0.0000
18000.	0.0000	0.0000
20000.	0.0000	0.0000
22000.	0.0000	0.0000
24000.	0.0000	0.0000
26000.	0.0000	0.0000
28000.	0.0000	0.0000

TABLE 39

SIMULATION PROGRAM RUN ON 02/16/74 AT 13.52.55, SUMMARY OF FLIGHTS ON CHANNEL 1 F-106 SEQUENCE E BIVARIATE DISTRIBUTION OF MEAN AND ALTERNATING STRESSES

	************** GROUND	DATA	**************				************ AIRBORNE	DATA	************				TOTAL	CUMM	CUMM
FLT ID	NUM PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	NUMBER PEAKS	NUMBER POINTS
1001	2	10489.	.1308E+08	.2214E+08	7932.	13046.	74	10524.	.3160E+08	.3635E+08	-8192.	28390.	76	76	92
1002	2	10002.	.2891E+08	.3430E+08	6200.	13804.	14	9561.	.2040E+08	.2195E+08	1907.	17147.	16	92	116
1003	0	0.	0.	0.	0.	0.	24	11234.	.1960E+08	.2822E+08	4501.	19793.	24	116	148
1004	0	0.	0.	0.	0.	0.	26	8427.	.1519E+08	.1520E+08	1107.	14274.	26	142	178
1005	0	0.	0.	0.	0.	0.	26	11434.	.2261E+08	.3244E+08	2158.	19608.	26	168	212
1006	0	0.	0.	0.	0.	0.	10	9696.	.2132E+08	.2330E+08	2943.	18088.	10	178	230
1007	0	0.	0.	0.	0.	0.	10	11228.	.3660E+08	.4574E+08	1435.	19025.	10	188	248
1008	0	0.	0.	0.	0.	0.	26	10446.	.2453E+08	.2906E+08	3266.	22621.	26	214	282
1009	2	12027.	.5464E+08	.8153E+08	6800.	17253.	38	10983.	.2021E+08	.2728E+08	2618.	19371.	40	254	330
1010	2	11510.	.2489E+08	.4473E+08	7983.	15038.	44	10847.	.2494E+08	.3127E+08	2633.	20433.	46	300	384
1011	0	0.	0.	0.	0.	0.	264	10892.	.2871E+08	.3514E+08	1153.	28184.	264	564	656
1012	0	0.	0.	0.	0.	0.	72	9878.	.2152E+08	.2385E+08	1968.	21851.	72	636	736
1013	0	0.	0.	0.	0.	0.	46	10073.	.2081E+08	.2381E+08	3250.	20707.	46	682	793
1014	0	0.	0.	0.	0.	0.	20	10992.	.1945E+08	.2674E+08	4285.	18599.	20	702	818
1015	0	0.	0.	0.	0.	0.	118	10713.	.2434E+08	.2993E+08	1292.	26671.	118	820	944
1016	2	11029.	.3267E+08	.4692E+08	6987.	15071.	68	10892.	.2847E+08	.3498E+08	3289.	29027.	70	890	1022
1017	0	0.	0.	0.	0.	0.	90	10787.	.2587E+08	.3183E+08	2091.	27454.	90	980	1120
1018	0	0.	0.	0.	0.	0.	78	10822.	.2689E+08	.3303E+08	3581.	30000.	78	1058	1206
1019	0	0.	0.	0.	0.	0.	6	8806.	.1829E+08	.1853E+08	3412.	15421.	6	1064	1216
1020	0	0.	0.	0.	0.	0.	54	10406.	.2033E+08	.2460E+08	2911.	22032.	54	1118	1278
1021	0	0.	0.	0.	0.	0.	72	10067.	.2105E+08	.2401E+08	146.	21274.	72	1190	1358
1022	0	0.	0.	0.	0.	0.	20	9280.	.2135E+08	.2224E+08	944.	19426.	20	1210	1386
1023	0	0.	0.	0.	0.	0.	36	11454.	.3323E+08	.4308E+08	2594.	30000.	36	1246	1430
1024	0	0.	0.	0.	0.	0.	32	9907.	.1999E+08	.2246E+08	3141.	20387.	32	1278	1470
1025	0	0.	0.	0.	0.	0.	98	10577.	.2160E+08	.2657E+08	-6.	21584.	98	1376	1576
1026	0	0.	0.	0.	0.	0.	18	11148.	.2119E+08	.2942E+08	4965.	22850.	18	1394	1602
1027	2	1364.	.1766E+09	.2745E+09	-8034.	10762.	10	12023.	.3824E+08	.5315E+08	3666.	20822.	12	1406	1622
1028	0	0.	0.	0.	0.	0.	54	9567.	.1682E+08	.1831E+08	2403.	18458.	54	1460	1684
1029	0	0.	0.	0.	0.	0.	22	11104.	.2553E+08	.3342E+08	4029.	22814.	22	1482	1714
1030	0	0.	0.	0.	0.	0.	38	11010.	.2283E+08	.3004E+08	3564.	24149.	38	1520	1760
1031	0	0.	0.	0.	0.	0.	52	11059.	.2628E+08	.3370E+08	2823.	23331.	52	1572	1820
1032	0	0.	0.	0.	0.	0.	8	10143.	.3565E+08	.3929E+08	2822.	18395.	8	1580	1836
1033	0	0.	0.	0.	0.	0.	52	11451.	.3181E+08	.4155E+08	3268.	28467.	52	1632	1896
1034	0	0.	0.	0.	0.	0.	2	8972.	.1060E+09	.1067E+09	1693.	16250.	2	1634	1906
1035	0	0.	0.	0.	0.	0.	36	10455.	.2069E+08	.2521E+08	2017.	19196.	36	1670	1950
1036	0	0.	0.	0.	0.	0.	68	10526.	.2978E+08	.3454E+08	-2293.	23513.	68	1738	2026
1037	0	0.	0.	0.	0.	0.	20	12167.	.3384E+08	.4910E+08	4727.	23447.	20	1758	2054
1038	0	0.	0.	0.	0.	0.	102	10381.	.2240E+08	.2652E+08	1289.	25640.	102	1860	2164
1039	0	0.	0.	0.	0.	0.	76	9830.	.2079E+08	.2298E+08	3671.	27347.	76	1936	2248
1040	0	0.	0.	0.	0.	0.	46	11286.	.3498E+08	.4373E+08	657.	26856.	46	1982	2302
1041	2	11021.	.2849E+08	.4265E+08	7247.	14795.	42	10307.	.2017E+08	.2405E+08	3868.	22221.	44	2026	2354
1042	4	12341.	.2406E+08	.4519E+08	6229.	16571.	68	10981.	.2886E+08	.3583E+08	3645.	26183.	72	2098	2434
1043	0	0.	0.	0.	0.	0.	70	10701.	.2191E+08	.2747E+08	2554.	20767.	70	2168	2512
1044	0	0.	0.	0.	0.	0.	114	10381.	.2447E+08	.3089E+08	1497.	25413.	114	2282	2634
1045	0	0.	0.	0.	0.	0.	82	10562.	.2399E+08	.2890E+08	2878.	24944.	82	2364	2724
1046	0	0.	0.	0.	0.	0.	44	10457.	.3337E+08	.3787E+08	1518.	24906.	44	2408	2776
1047	0	0.	0.	0.	0.	0.	28	11650.	.3678E+08	.4800E+08	-439.	26633.	28	2436	2812
1048	4	6819.	.1325E+09	.1356E+09	-8839.	18781.	114	10904.	.2572E+08	.3224E+08	1358.	26183.	118	2554	2938
1049	2	9945.	.1662E+08	.2164E+08	7063.	12828.	68	10631.	.2785E+08	.3309E+08	2299.	27730.	70	2624	3016
1050	0	0.	0.	0.	0.	0.	64	10872.	.3518E+08	.4159E+08	1703.	30000.	64	2688	3088

TABLE 40

SUMMARY OF DATA ON EACH CHANNEL
F-106 SEQUENCE E BIVARIATE DISTRIBUTION OF MEAN AND ALTERNATING STRESSES

					************** GROUND	DATA	**************				************ AIRBORNE	DATA	************			
CHAN NO.	NUM REC	NO. OF PEAKS	NO. OF POINTS	NUM FLTS	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE
1	2572	190012	216032	3386	23198.	-8886.	1170	9414.	.3178E+08	.3289E+08	30000.	-9520.	188842	10605.	.2337E+08	.2840E+08
2	2573	190984	216092	3255	22989.	-9182.	1062	9194.	.3382E+08	.3452E+08	30000.	-9387.	189922	10603.	.2344E+08	.2848E+08
3	2572	189532	216048	3453	23302.	-9015.	1256	9377.	.3471E+08	.3574E+08	30000.	-9848.	188276	10612.	.2355E+08	.2863E+08
TOT	7717	570528	648172	10094	23302.	-9182.	3488	9334.	.3344E+08	.3439E+08	30000.	-9848.	567040	10607.	.2345E+08	.2850E+08

TABLE 41

CUMULATIVE PROBABILITY FOR NEGATIVE GROUND PEAK DISTRIBUTION DATA
F-106 SEQUENCE E SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
-1500.	55	80.	1.00000000
-3000.	11	25.	.31250000
-4000.	2	14.	.17500000
-5000.	2	12.	.15000000
-7000.	2	10.	.12500000
-12000.	1	8.	.10000000
-14000.	7	7.	.08750000
-16000.	0	0.	0.00000000

TABLE 42

CUMULATIVE PROBABILITY FOR POSITIVE GROUND PEAK DISTRIBUTION DATA
F-106 SEQUENCE E SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
3000.	34	80.	1.00000000
4000.	38	46.	.57500000
5000.	3	8.	.10000000
6000.	1	5.	.06250000
7000.	1	4.	.05000000
8000.	1	3.	.03750000
12000.	1	2.	.02500000
14000.	1	1.	.01250000
16000.	0	0.	0.00000000

TABLE 43

CUMULATIVE PROBABILITY FOR NEGATIVE AIRBORNE PEAK DISTRIBUTION DATA
F-106 SEQUENCE E SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
-1500.	11014	14107.	1.00000000
-3000.	1957	3093.	.21925285
-4000.	687	1136.	.08052740
-5000.	280	449.	.03182817
-6000.	99	169.	.01197987
-7000.	36	70.	.00496208
-8000.	17	34.	.00241015
-9000.	9	17.	.00120508
-10000.	6	8.	.00056709
-14000.	1	2.	.00014177
-15000.	1	1.	.00007089
-18000.	0	0.	0.00000000

TABLE 44

CUMULATIVE PROBABILITY FOR POSITIVE AIRBORNE PEAK DISTRIBUTION DATA F-106 SEQUENCE E SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
3000.	5688	14107.	1.00000000
4000.	3346	8419.	.59679592
5000.	1683	5073.	.35960870
6000.	1017	3390.	.24030623
7000.	671	2373.	.16821436
8000.	445	1702.	.12064932
9000.	295	1257.	.08910470
10000.	378	962.	.06819310
12000.	213	584.	.04139789
14000.	164	371.	.02629900
16000.	98	207.	.01467357
18000.	54	109.	.00772666
20000.	55	55.	.00389877
25000.	0	0.	0.00000000

TABLE 45

CUMULATIVE PROBABILITY FOR NUMBER OF GROUND PEAKS PER FLIGHT DATA F-106 SEQUENCE E SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
0.	325	381.	1.00000000
1.	43	56.	.14698163
2.	7	13.	.03412073
3.	3	6.	.01574803
4.	1	3.	.00787402
5.	1	2.	.00524934
11.	1	1.	.00262467
31.	0	0.	0.00000000

TABLE 46

CUMULATIVE PROBABILITY FOR NUMBER OF AIRBORNE PEAKS PER FLIGHT DATA
F-106 SEQUENCE E SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
1.	147	381.	1.00000000
26.	109	234.	.61417323
51.	71	125.	.32808399
76.	22	54.	.14173228
101.	18	32.	.08398950
126.	6	14.	.03674541
151.	2	8.	.02099738
201.	3	6.	.01574803
251.	2	3.	.00787402
301.	1	1.	.00262467
601.	0	0.	0.00000000

TABLE 47

SIMULATION PROGRAM RUN ON 02/16/74 AT 13.42.47, SUMMARY OF FLIGHT ON CHANNEL 4
F-106 SEQUENCE E SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

	************** G R O U N D			D A T A	**************		************ A I R B O R N E				D A T A	************	TOTAL	CUMM	CUMM
FLT ID	NUM PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	NUMBER PEAKS	NUMBER POINTS
4001	1	11665.	0.	0.	11665.	11665.	50	9710.	.2276E+08	.2461E+08	1982.	23802.	51	51	67
4002	0	0.	0.	0.	0.	0.	5	10742.	.1583E+08	.2393E+08	6361.	15439.	5	56	75
4003	0	0.	0.	0.	0.	0.	54	9415.	.1481E+08	.1534E+08	3607.	17414.	54	110	138
4004	0	0.	0.	0.	0.	0.	53	9754.	.1825E+08	.2026E+08	4362.	25552.	53	163	199
4005	0	0.	0.	0.	0.	0.	69	9567.	.1538E+08	.1735E+08	2676.	16801.	69	232	276
4006	0	0.	0.	0.	0.	0.	34	9698.	.1582E+08	.1764E+08	5146.	19462.	34	266	318
4007	0	0.	0.	0.	0.	0.	12	10458.	.2921E+08	.3402E+08	4454.	20035.	12	278	333
4008	0	0.	0.	0.	0.	0.	36	10063.	.2491E+08	.2789E+08	3012.	25457.	36	314	392
4009	0	0.	0.	0.	0.	0.	9	11514.	.3625E+08	.4917E+08	5753.	21442.	9	323	393
4010	0	0.	0.	0.	0.	0.	37	9721.	.2138E+08	.2328E+08	1725.	21633.	37	360	444
4011	0	0.	0.	0.	0.	0.	69	10158.	.2820E+08	.3148E+08	4361.	29117.	69	429	521
4012	0	0.	0.	0.	0.	0.	50	9443.	.1708E+08	.1828E+08	3384.	22938.	50	479	573
4013	0	0.	0.	0.	0.	0.	74	9985.	.2853E+08	.3126E+08	1673.	30000.	74	553	661
4014	0	0.	0.	0.	0.	0.	41	9762.	.1973E+08	.2174E+08	2147.	21207.	41	594	710
4015	0	0.	0.	0.	0.	0.	7	10244.	.2230E+08	.2554E+08	3490.	14365.	7	601	721
4016	0	0.	0.	0.	0.	0.	13	9985.	.2023E+08	.2315E+08	4996.	17370.	13	614	742
4017	0	0.	0.	0.	0.	0.	6	9736.	.2131E+08	.2359E+08	5456.	16163.	6	620	755
4018	0	0.	0.	0.	0.	0.	13	10364.	.2130E+08	.2625E+08	4939.	19233.	13	633	777
4019	0	0.	0.	0.	0.	0.	4	9519.	.1452E+08	.1461E+08	4312.	12043.	4	637	785
4020	1	12184.	0.	0.	12184.	12184.	7	8095.	.1793E+08	.1801E+08	1711.	13132.	8	645	797
4021	0	0.	0.	0.	0.	0.	48	9872.	.1345E+08	.2179E+08	2889.	20471.	48	693	853
4022	0	0.	0.	0.	0.	0.	54	9595.	.1591E+08	.1744E+08	3938.	18926.	54	747	915
4023	2	9062.	.2053E+09	.2152E+09	5857.	12265.	70	9377.	.2059E+08	.2164E+08	-409.	23949.	72	819	935
4024	0	0.	0.	0.	0.	0.	44	10147.	.3033E+08	.3360E+08	3836.	29551.	44	863	1047
4025	0	0.	0.	0.	0.	0.	27	9718.	.1886E+08	.2077E+08	3437.	18354.	27	890	1082
4026	0	0.	0.	0.	0.	0.	16	9646.	.2332E+08	.2509E+08	4710.	22839.	16	906	1106
4027	0	0.	0.	0.	0.	0.	23	9905.	.2315E+08	.2564E+08	4450.	25674.	23	929	1137
4028	0	0.	0.	0.	0.	0.	2	10113.	.2596E+08	.3210E+08	6510.	13715.	2	931	1143
4029	2	2597.	.175[illegible]E+09	.2409E+09	-6707.	12081.	28	10316.	.2948E+08	.3344E+08	3832.	25176.	30	961	1181
4030	0	0.	0.	0.	0.	0.	206	9963.	.2517E+08	.2775E+08	606.	30000.	206	1167	1335
4031	1	13291.	0.	0.	13291.	13291.	51	9902.	.2243E+08	.2485E+08	4387.	22983.	52	1219	1455
4032	0	0.	0.	0.	0.	0.	6	12375.	.6922E+08	.8956E+08	4838.	25602.	6	1225	1469
4033	0	0.	0.	0.	0.	0.	50	9855.	.2730E+08	.2953E+08	2699.	29435.	50	1275	1527
4034	0	0.	0.	0.	0.	0.	22	9149.	.1393E+08	.1458E+08	2683.	15283.	22	1297	1553
4035	0	0.	0.	0.	0.	0.	36	9712.	.1696E+08	.1844E+08	4898.	18395.	36	1333	1597
4036	0	0.	0.	0.	0.	0.	38	9403.	.2122E+08	.2234E+08	3481.	21358.	38	1371	1643
4037	2	11058.	.45[illegible]E+08	.6939E+08	6271.	15845.	47	9496.	.1499E+08	.1630E+08	3503.	16539.	49	1420	1700
4038	0	0.	0.	0.	0.	0.	23	9930.	.1727E+08	.2002E+08	4631.	18343.	23	1443	1731
4039	0	0.	0.	0.	0.	0.	19	9579.	.2227E+08	.2384E+08	-170.	17350.	19	1462	1759
4040	1	11892.	0.	0.	11892.	11892.	74	9200.	.2091E+08	.2162E+08	-9159.	17711.	75	1537	1841
4041	0	0.	0.	0.	0.	0.	25	10194.	.2149E+08	.2439E+08	4080.	17026.	25	1562	1874
4042	0	0.	0.	0.	0.	0.	20	9109.	.1365E+08	.1424E+08	3887.	14739.	20	1582	1899
4043	0	0.	0.	0.	0.	0.	56	9606.	.2259E+08	.2417E+08	4065.	29619.	56	1638	1952
4044	0	0.	0.	0.	0.	0.	18	8849.	.1049E+08	.1074E+08	4182.	12984.	18	1656	1984
4045	0	0.	0.	0.	0.	0.	8	10276.	.2535E+08	.2955E+08	5507.	20024.	8	1664	2003
4046	0	0.	0.	0.	0.	0.	68	9538.	.1539E+08	.1680E+08	3014.	17529.	68	1732	2076
4047	0	0.	0.	0.	0.	0.	220	9916.	.2447E+08	.2690E+08	2721.	30000.	220	1952	2304
4048	0	0.	0.	0.	0.	0.	100	9913.	.2243E+08	.2487E+08	2031.	25601.	100	2052	2412
4049	0	0.	0.	0.	0.	0.	57	9671.	.1544E+08	.1719E+08	3063.	19832.	57	2109	2477
4050	3	7218.	.1103E+09	.1127E+09	-4934.	13325.	8	9730.	.1583E+08	.1804E+08	5419.	14074.	11	2120	2492

TABLE 48

SUMMARY OF DATA ON EACH CHANNEL
F-106 SEQUENCE E SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

					************** G R O U N D		D A T A **************				************* A I R B O R N E		D A T A ***********			
CHAN NO.	NUM REC	NO. OF PEAKS	NO. OF POINTS	NUM FLTS	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE
4	2572	185290	216038	4112	23965.	-7525.	991	10701.	.2029E+08	.2578E+08	30000.	-9537.	185239	9754.	.2075E+08	.2270E+08
5	2572	187320	215024	3364	24186.	-7573.	948	10792.	.2191E+08	.2778E+08	30000.	-9094.	186372	9736.	.2066E+08	.2255E+08
6	2573	196691	216067	4035	24124.	-7409.	991	10809.	.2103E+08	.2703E+08	30000.	-9301.	185700	9750.	.2072E+08	.2265E+08
TOT	7717	563701	649129	12111	24186.	-7525.	2930	10764.	.2105E+08	.2683E+08	30000.	-9537.	557371	9747.	.2071E+08	.2263E+08

TABLE 49

CUMULATIVE PROBABILITY FOR NEGATIVE GROUND PEAK DISTRIBUTION DATA
F-106 SEQUENCE E LIMITED SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
-1500.	55	80.	1.00000000
-3000.	11	25.	.31250000
-4000.	2	14.	.17500000
-5000.	2	12.	.15000000
-7000.	2	10.	.12500000
-12000.	1	9.	.10000000
-14000.	7	7.	.08750000
-15000.	0	0.	0.00000000

TABLE 50

CUMULATIVE PROBABILITY FOR POSITIVE GROUND PEAK DISTRIBUTION DATA
F-106 SEQUENCE E LIMITED SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
3000.	34	80.	1.00000000
4000.	38	46.	.57500000
5000.	3	8.	.10000000
6000.	1	5.	.06250000
7000.	1	4.	.05000000
8000.	1	3.	.03750000
12000.	1	2.	.02500000
14000.	1	1.	.01250000
16000.	0	0.	0.00000000

TABLE 51

CUMULATIVE PROBABILITY FOR NEGATIVE AIRBORNE PEAK DISTRIBUTION DATA
F-106 SEQUENCE E LIMITED SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
-1500.	11014	14107.	1.00000000
-3000.	1957	3093.	.21925285
-4000.	687	1136.	.08052740
-5000.	280	449.	.03182817
-6000.	99	169.	.01197987
-7000.	36	70.	.00496208
-8000.	17	34.	.00241015
-9000.	9	17.	.00120508
-10000.	6	8.	.00056709
-14000.	1	2.	.00014177
-16000.	1	1.	.00007089
-18000.	0	0.	0.00000000

TABLE 52

CUMULATIVE PROBABILITY FOR POSITIVE AIRBORNE PEAK DISTRIBUTION DATA
F-106 SEQUENCE E LIMITED SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
3000.	5688	14107.	1.00000000
4000.	3346	8419.	.59679592
5000.	1683	5073.	.35960870
6000.	1017	3390.	.24030623
7000.	671	2373.	.16821436
8000.	445	1702.	.12064932
9000.	295	1257.	.08910470
10000.	378	962.	.06819310
12000.	213	584.	.04139789
14000.	164	371.	.02629900
16000.	98	207.	.01467357
18000.	54	109.	.00772666
20000.	55	55.	.00389877
25000.	0	0.	0.00000000

TABLE 53

CUMULATIVE PROBABILITY FOR NUMBER OF GROUND PEAKS PER FLIGHT DATA
F-106 SEQUENCE E LIMITED SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
0.	325	381.	1.00000000
2.	56	56.	.14698163
4.	0	0.	0.00000000

TABLE 54

CUMULATIVE PROBABILITY FOR NUMBER OF AIRBORNE PEAKS PER FLIGHT DATA F-106 SEQUENCE E LIMITED SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
27.	256	381.	1.00000000
57.	117	125.	.32808399
257.	8	8.	.02099738
447.	0	0.	0.00000000

TABLE 55

SIMULATION PROGRAM RUN ON 02/16/74 AT 14.03.37, SUMMARY OF FLIGHTS ON CHANNEL 7
F-106 SEQUENCE E LIMITED SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

FLT	******** GROUND			DATA ********			******** AIRBORNE			DATA ********			TOTAL	CUMM	CUMM
ID	NUM PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	NUMBER PEAKS	NUMBER POINTS
7001	0	0.	0.	0.	0.	0.	27	9245.	.1055E+08	.1136E+08	5401.	13750.	27	27	39
7002	0	0.	0.	0.	0.	0.	27	9910.	.2389E+08	.2637E+08	2451.	23404.	27	54	74
7003	0	0.	0.	0.	0.	0.	257	9714.	.2205E+08	.2389E+08	-13.	27851.	257	311	339
7004	0	0.	0.	0.	0.	0.	67	9399.	.1816E+08	.1924E+08	3143.	22204.	67	378	414
7005	0	0.	0.	0.	0.	0.	27	9947.	.3164E+08	.3426E+08	3243.	27704.	27	405	449
7006	0	0.	0.	0.	0.	0.	27	10528.	.3084E+08	.3618E+08	3524.	27303.	27	432	484
7007	0	0.	0.	0.	0.	0.	27	10246.	.2476E+08	.2845E+08	3178.	20673.	27	459	519
7008	0	0.	0.	0.	0.	0.	27	9737.	.1374E+08	.1570E+08	4768.	15445.	27	486	550
7009	0	0.	0.	0.	0.	0.	67	9810.	.1737E+08	.1950E+08	3471.	19602.	67	553	625
7010	0	0.	0.	0.	0.	0.	67	9655.	.1567E+08	.1737E+08	3516.	17173.	67	620	700
7011	0	0.	0.	0.	0.	0.	27	10390.	.2647E+08	.3075E+08	5092.	24094.	27	647	735
7012	0	0.	0.	0.	0.	0.	67	9767.	.2117E+08	.2318E+08	3391.	25069.	67	714	810
7013	0	0.	0.	0.	0.	0.	27	10503.	.2350E+08	.3327E+08	5121.	27461.	27	741	845
7014	0	0.	0.	0.	0.	0.	67	10056.	.2470E+08	.2762E+08	4033.	30000.	67	808	920
7015	0	0.	0.	0.	0.	0.	27	9551.	.1855E+08	.2003E+08	3361.	16664.	27	835	955
7016	0	0.	0.	0.	0.	0.	67	9539.	.2017E+08	.2158E+08	3440.	22039.	67	902	1030
7017	0	0.	0.	0.	0.	0.	27	9209.	.1232E+08	.1307E+08	3606.	14098.	27	929	1061
7018	0	0.	0.	0.	0.	0.	67	10007.	.3283E+08	.3558E+08	758.	27662.	67	996	1136
7019	0	0.	0.	0.	0.	0.	27	10338.	.2807E+08	.3213E+08	4481.	22866.	27	1023	1171
7020	0	0.	0.	0.	0.	0.	27	9577.	.1276E+08	.1430E+08	5389.	16724.	27	1050	1206
7021	0	0.	0.	0.	0.	0.	257	9677.	.2110E+08	.2284E+08	-3876.	23985.	257	1307	1471
7022	0	0.	0.	0.	0.	0.	27	9930.	.1851E+08	.2117E+08	4561.	22010.	27	1334	1505
7023	0	0.	0.	0.	0.	0.	67	9761.	.1453E+08	.1555E+08	3607.	19465.	67	1401	1581
7024	2	9062.	.3650E+08	.3748E+08	4791.	13334.	27	10437.	.2491E+08	.2929E+08	4503.	24496.	29	1430	1618
7025	0	0.	0.	0.	0.	0.	67	10054.	.2591E+08	.2882E+08	1547.	30000.	67	1497	1693
7026	0	0.	0.	0.	0.	0.	27	10051.	.2501E+08	.2737E+08	4130.	23750.	27	1524	1728
7027	0	0.	0.	0.	0.	0.	67	10168.	.3158E+08	.3489E+08	2037.	24396.	67	1591	1803
7028	0	0.	0.	0.	0.	0.	27	9535.	.2451E+08	.2594E+08	197.	18733.	27	1618	1833
7029	0	0.	0.	0.	0.	0.	27	10025.	.2369E+08	.2656E+08	1679.	20503.	27	1645	1873
7030	2	9707.	.1959E+08	.2370E+08	6663.	12923.	27	9932.	.2347E+08	.2621E+08	3771.	25444.	29	1674	1910
7031	2	9525.	.1887E+08	.2159E+08	6454.	12597.	67	9871.	.2273E+08	.2504E+08	3317.	25939.	69	1743	1987
7032	2	10467.	.4594E+08	.5472E+08	5680.	15255.	27	9677.	.1562E+08	.1742E+08	3762.	18124.	29	1772	2024
7033	2	10019.	.2401E+08	.2951E+08	5554.	13484.	27	9845.	.1918E+08	.2147E+08	3626.	17028.	29	1801	2061
7034	0	0.	0.	0.	0.	0.	27	10041.	.1806E+08	.2099E+08	4472.	17939.	27	1828	2096
7035	0	0.	0.	0.	0.	0.	27	9868.	.1930E+08	.2166E+08	5379.	21729.	27	1855	2131
7036	0	0.	0.	0.	0.	0.	27	9688.	.1994E+08	.2177E+08	4187.	23146.	27	1882	2166
7037	0	0.	0.	0.	0.	0.	27	9539.	.1702E+08	.1846E+08	3676.	20169.	27	1909	2201
7038	0	0.	0.	0.	0.	0.	67	10138.	.2574E+08	.2895E+08	3628.	27327.	67	1976	2276
7039	0	0.	0.	0.	0.	0.	27	9756.	.2195E+08	.2397E+08	2923.	20390.	27	2003	2311
7040	2	9437.	.2435E+08	.2717E+08	5912.	12962.	27	9213.	.1322E+08	.1398E+08	4063.	14901.	29	2032	2344
7041	0	0.	0.	0.	0.	0.	27	9994.	.1733E+08	.2006E+08	5242.	19583.	27	2059	2379
7042	0	0.	0.	0.	0.	0.	27	9425.	.1553E+08	.1671E+08	2694.	16388.	27	2086	2414
7043	2	9452.	.1607E+08	.1945E+08	5618.	12297.	27	9755.	.1567E+08	.1859E+08	4368.	19142.	29	2115	2451
7044	0	0.	0.	0.	0.	0.	27	9852.	.2081E+08	.2315E+08	4557.	18498.	27	2142	2486
7045	2	9546.	.2323E+08	.2510E+08	6134.	12958.	67	9711.	.2271E+08	.2457E+08	2025.	28576.	69	2211	2563
7046	0	0.	0.	0.	0.	0.	67	9706.	.2342E+08	.2526E+08	-6903.	22839.	67	2278	2639
7047	0	0.	0.	0.	0.	0.	27	9222.	.1140E+08	.1218E+08	3208.	13970.	27	2305	2669
7048	0	0.	0.	0.	0.	0.	67	9438.	.1619E+08	.1737E+08	-582.	20794.	67	2372	2744
7049	2	4530.	.1419E+09	.1705E+09	-3844.	13005.	67	9763.	.1928E+08	.2128E+08	4595.	27482.	69	2441	2821
7050	0	0.	0.	0.	0.	0.	27	10099.	.2683E+08	.2997E+08	4461.	24271.	27	2468	2856

TABLE 56

SUMMARY OF DATA ON EACH CHANNEL
F-106 SEQUENCE E LIMITED SEPARATE POSITIVE AND NEGATIVE DISTRIBUTIONS

					************** G R O U N D			D A T A *************			************ A I R B O R N E			D A T A ***********	
CHAN NO.	NUM REC	NO. OF PEAKS	NO. OF POINTS	NUM FLTS	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE
7	2573	184243	215057	4161	23621.	-7639.	1172	8613.	.2530E+08	.2536E+08	30000.	-9562.	183077	9805.	.2074E+08	.2283E+08
8	2573	184080	215084	4178	24243.	-7595.	1154	8505.	.2786E+08	.2789E+08	30000.	-9623.	182916	9803.	.2072E+08	.2280E+08
9	2572	184253	216014	4156	24350.	-7614.	1198	8533.	.2770E+08	.2773E+08	30000.	-9607.	183052	9800.	.2067E+08	.2274E+08
TOT	7718	552573	648155	12495	24350.	-7639.	3534	8550.	.2595E+08	.2698E+08	30000.	-9623.	549045	9803.	.2071E+08	.2279E+08

TABLE 57

CUMULATIVE PROBABILITY FOR NUMBER OF AIRBORNE PEAKS PER FLIGHT DATA
B-58 SEQUENCE B BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
1.	8	282.	1.00000000
26.	28	274.	.97163121
51.	23	246.	.87234043
76.	30	223.	.79078014
101.	25	193.	.68439716
126.	18	168.	.59574468
151.	21	150.	.53191489
176.	17	129.	.45744681
201.	15	112.	.39716312
226.	22	97.	.34397163
251.	8	75.	.26595745
276.	8	67.	.23758865
301.	2	59.	.20921986
326.	7	57.	.20212766
351.	8	50.	.17730496
401.	10	42.	.14893617
451.	5	32.	.11347518
501.	7	27.	.09574468
601.	3	20.	.07092199
701.	4	17.	.06028369
801.	2	13.	.04609929
901.	2	11.	.03900709
1001.	3	9.	.03191489
1126.	2	6.	.02127660
1251.	1	4.	.01418440
1501.	1	3.	.01063830
1751.	1	2.	.00709220
2001.	1	1.	.00354610
2251.	0	0.	0.00000000

TABLE 58

CUMULATIVE PROBABILITY FOR GROUND 1-G STRESS DISTRIBUTION DATA
B-58 SEQUENCE B BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
-14000.	1	270.	1.00000000
-13000.	9	269.	.99629630
-12000.	22	260.	.96296296
-11000.	14	238.	.88148148
-10500.	18	224.	.82962963
-10000.	17	206.	.76296296
-9500.	14	189.	.70000000
-9000.	15	175.	.64814815
-8500.	15	160.	.59259259
-8000.	13	145.	.53703704
-7500.	3	132.	.48888889
-7000.	10	129.	.47777778
-6500.	7	119.	.44074074
-6000.	13	112.	.41481481
-5500.	11	99.	.36666667
-5000.	9	88.	.32592593
-4500.	11	79.	.29259259
-4000.	8	68.	.25185185
-3500.	12	60.	.22222222
-3000.	3	48.	.17777778
-2500.	3	45.	.16666667
-2000.	10	37.	.13703704
-1000.	13	27.	.10000000
0.	5	14.	.05185185
1000.	9	9.	.03333333
2000.	0	0.	0.00000000

TABLE 59

CUMULATIVE PROBABILITY FOR AIRBORNE 1-G STRESS DISTRIBUTION DATA
B-58 SEQUENCE B BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
5000.	1	282.	1.00000000
7000.	2	281.	.99645390
8000.	1	279.	.98936170
9000.	7	278.	.98581560
10000.	4	271.	.96099291
10500.	10	267.	.94680851
11000.	9	257.	.91134752
11500.	7	248.	.87943262
12000.	22	241.	.85460993
12500.	17	219.	.77659574
13000.	17	202.	.71631206
13500.	19	185.	.65602837
14000.	28	166.	.58865248
14500.	13	138.	.48936170
15000.	13	125.	.44326241
15500.	22	112.	.39716312
16000.	24	90.	.31914894
16500.	11	66.	.23404255
17000.	13	55.	.19503546
17500.	13	42.	.14893617
18000.	14	29.	.10283688
19000.	8	15.	.05319149
20000.	6	7.	.02482270
21000.	1	1.	.00354610
22000.	0	0.	0.00000000

TABLE 60

CUMULATIVE PROBABILITY FOR PREFLIGHT STRESS DISTRIBUTION DATA
B-58 SEQUENCE B BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

VALUE	FREQ DIST	CUM.DIST	PROBABILITY
-8950.	2	282.	1.00000000
-8900.	16	280.	.99290780
-8850.	53	264.	.93617021
-8800.	54	211.	.74822695
-8750.	35	157.	.55673759
-8700.	45	122.	.43262411
-8650.	31	77.	.27304965
-8600.	19	46.	.16312057
-8550.	13	27.	.09574468
-8500.	4	14.	.04964539
-8450.	3	10.	.03546099
-8400.	2	7.	.02482270
-8250.	1	5.	.01773050
-8100.	3	4.	.01418440
-8000.	1	1.	.00354610
-7600.	0	0.	0.00000000

TABLE 61

FREQUENCY DISTRIBUTION TABLE OF PEAK AND VALLEY STRESSES FOR GROUND DATA
B-58 SEQUENCE B BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

PEAK	VALLEY STFESS														
STPESS	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	8000.	9000.	10000.	12000.	14000.	16000.	TOTAL
3000.	3	21	61	112	32	15	6	5	1	1	2	1	1	0	281
4000.	0	39	123	98	26	8	4	3	2	1	0	0	0	0	304
5000.	3	36	48	38	15	3	1	1	1	0	0	0	0	0	146
6000.	5	13	15	8	4	2	1	0	0	0	1	0	0	0	49
7000.	1	4	3	5	2	0	0	0	0	0	0	0	0	0	15
8000.	2	1	1	0	2	0	1	1	0	0	0	0	0	0	8
9000.	0	0	0	1	2	0	0	0	0	0	0	0	0	0	3
10000.	0	0	2	1	0	0	0	0	0	0	0	0	1	0	4
12000.	1	0	0	3	2	0	0	0	0	0	0	0	0	0	6
14000.	0	0	1	1	0	1	0	0	0	0	1	0	0	0	4
16000.	0	0	0	1	0	2	2	2	1	0	0	0	0	0	8
18000.	1	0	0	0	1	0	0	0	0	0	1	0	1	0	4
20000.	0	2	1	0	0	1	0	0	0	0	0	0	0	0	4
25000.	0	0	0	0	1	0	0	0	0	0	1	0	0	0	2
30000.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	16	116	275	268	87	32	15	12	5	2	6	1	3	0	838

TABLE 62

FREQUENCY DISTRIBUTION TABLE OF PEAK AND VALLEY STRESSES FOR AIRBORNE DATA
B-58 SEQUENCE B BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

PEAK STRESS	VALLEY STRESS 0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	8000.	9000.	10000.	12000.	14000.	16000.	18000.	20000.	25000.	30000.
3000.	1	34	421	3565	3195	1673	731	304	149	85	46	16	5	3	1	2	1	0
4000.	3	94	1519	3163	2244	1325	622	254	122	56	42	13	5	5	1	0	0	0
5000.	26	501	1268	1709	1371	794	375	183	98	49	43	12	1	1	0	1	0	0
6000.	185	449	686	756	656	446	256	140	61	48	26	9	3	0	0	0	0	0
7000.	167	227	333	340	324	260	115	80	30	32	21	8	2	0	0	1	0	0
8000.	97	120	169	174	137	103	71	49	27	12	13	6	1	0	0	0	1	0
9000.	67	67	90	83	89	71	37	27	11	5	1	3	0	0	0	0	0	0
10000.	40	49	76	74	76	50	36	27	14	5	9	2	0	0	0	0	0	0
12000.	19	16	19	27	16	19	17	7	2	6	4	1	3	0	0	0	0	0
14000.	5	7	9	10	5	3	0	1	2	0	1	0	0	0	0	0	0	0
16000.	2	3	2	3	4	0	2	1	0	0	0	0	1	0	0	0	0	0
18000.	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20000.	3	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
25000.	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30000.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	613	1571	4588	9906	8118	4744	2263	1073	515	299	206	70	21	9	2	4	2	0

PEAK	VALLEY STRESS TOTAL
3000.	10232
4000.	9468
5000.	6432
6000.	3716
7000.	1940
8000.	980
9000.	551
10000.	458
12000.	156
14000.	44
16000.	18
18000.	7
20000.	7
25000.	1
30000.	0
TOTAL	34010

TABLE 63

CUMULATIVE PROBABILITY FOR PEAK STRESS FOR GROUND BIVARIATE TABLE B-58 SEQUENCE B BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
3000.	261	838.	1.00000000
4000.	304	567.	.66467780
5000.	146	253.	.30190931
6000.	49	107.	.12768496
7000.	15	58.	.06921241
8000.	8	43.	.05131265
9000.	3	35.	.04176611
10000.	4	32.	.03818616
12000.	6	28.	.03341289
14000.	4	22.	.02625298
16000.	8	18.	.02147971
18000.	4	10.	.01193317
20000.	4	6.	.00715990
25000.	2	2.	.00238663
30000.	0	0.	0.00000000

TABLE 64

CUMULATIVE PROBABILITY TABLE OF PEAK AND VALLEY STRESSES FOR GROUND DATA B-58 SEQUENCE B BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

PEAK STRESS	VALLEY STRESS 0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	8000.	9000.	10000.	12000.	14000.	16000.
3000.	1.0000	.9833	.9146	.5263	.2278	.1139	.0605	.0391	.0214	.0178	.0142	.0071	.0036	0.0000
4000.	1.0000	1.0000	.8717	.4571	.1447	.0592	.0329	.0197	.0099	.0033	0.0000	0.0000	0.0000	0.0000
5000.	1.0000	.9795	.7329	.4141	.1433	.0411	.0205	.0137	.0068	0.0000	0.0000	0.0000	0.0000	0.0000
6000.	1.0000	.8980	.6327	.3265	.1633	.0816	.0408	.0204	.0204	.0204	.0204	0.0000	0.0000	0.0000
7000.	1.0000	.9333	.6667	.4667	.1333	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8000.	1.0000	.7500	.6250	.5000	.5000	.2500	.2500	.1250	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9000.	1.0000	1.0000	1.0000	1.0000	.6667	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10000.	1.0000	1.0000	1.0000	.5000	.2500	.2500	.2500	.2500	.2500	.2500	.2500	.2500	.2500	0.0000
12000.	1.0000	.8333	.8333	.8333	.3333	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14000.	1.0000	1.0000	1.0000	.7500	.5000	.5000	.2500	.2500	.2500	.2500	.2500	0.0000	0.0000	0.0000
16000.	1.0000	1.0000	1.0000	1.0000	.8750	.8750	.6250	.3750	.1250	0.0000	0.0000	0.0000	0.0000	0.0000
18000.	1.0000	.7500	.7500	.7500	.7500	.5000	.5000	.5000	.5000	.5000	.5000	.2500	.2500	0.0000
20000.	1.0000	1.0000	.5000	.2500	.2500	.2500	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25000.	1.0000	1.0000	1.0000	1.0000	1.0000	.5000	.5000	.5000	.5000	.5000	.5000	0.0000	0.0000	0.0000
30000.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

TABLE 65

CUMULATIVE PROBABILITY FOR PEAK STRESS FOR AIRBORNE BIVARIATE TABLE
B-58 SEQUENCE B BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
3000.	10232	34010.	1.00000000
4000.	9468	23778.	.69914731
5000.	6432	14310.	.42075860
6000.	3716	7878.	.23163775
7000.	1940	4162.	.12237577
8000.	980	2222.	.06533373
9000.	551	1242.	.03651867
10000.	458	691.	.02031755
12000.	156	233.	.00685093
14000.	44	77.	.00226404
16000.	18	33.	.00097030
18000.	7	15.	.00044105
20000.	7	8.	.00023522
25000.	1	1.	.00002940
30000.	0	0.	0.00000000

TABLE 66

CUMULATIVE PROBABILITY TABLE OF PEAK AND VALLEY STRESSES FOR AIRBORNE DATA
B-58 SEQUENCE B BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

PEAK	VALLEY STRESS																	
STRESS	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	8000.	9000.	10000.	12000.	14000.	16000.	18000.	20000.	25000.	30000.
3000.	1.0000	.9399	.9967	.9534	.6070	.2948	.1313	.0598	.0301	.0156	.0072	.0027	.0012	.0007	.0004	.0003	.0001	0.0000
4000.	1.0000	.9997	.9896	.8233	.4952	.2582	.1183	.0526	.0258	.0129	.0070	.0025	.0012	.0006	.0001	0.0000	0.0000	0.0000
5000.	1.0000	.9960	.9181	.7209	.4552	.2421	.1186	.0603	.0319	.0166	.0090	.0023	.0005	.0003	.0002	.0002	0.0000	0.0000
6000.	1.0000	.9499	.8291	.6461	.4427	.2661	.1461	.0772	.0396	.0231	.0102	.0032	.0008	0.0000	0.0000	0.0000	0.0000	0.0000
7000.	1.0000	.9139	.7965	.6253	.4500	.2830	.1490	.0397	.0485	.0330	.0165	.0057	.0015	.0005	.0005	.0005	0.0000	0.0000
8000.	1.0000	.9010	.7785	.6031	.4286	.2888	.1837	.1112	.0512	.0337	.0214	.0082	.0020	.0010	.0010	.0010	.0010	0.0000
9000.	1.0000	.8784	[illegible]	.5335	.4429	.2813	.1525	.0353	.0363	.0163	.0073	.0054	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10000.	1.0000	.9127	.8057	.6357	.4732	.3122	.2031	.1245	.0655	.0349	.0240	.0044	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12000.	1.0000	.8782	.7757	.6538	.4308	.3782	.2564	.1474	.1026	.0897	.0513	.0256	.0192	0.0000	0.0000	0.0000	0.0000	0.0000
14000.	1.0000	.8636	.7045	.5000	.2727	.1591	.0909	.0909	.0682	.0227	.0227	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
16000.	1.0000	.8889	.7222	.5111	.4444	.2222	.2222	.1111	.0556	.0556	.0556	.0556	.0556	0.0000	0.0000	0.0000	0.0000	0.0000
18000.	1.0000	.7143	.4286	.1429	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20000.	1.0000	.5714	.2857	.2857	.2857	.1429	.1429	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25000.	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
30000.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

TABLE 67

SIMULATION PROGRAM RUN ON 08/05/74 AT 18.33.21, SUMMARY OF FLIGHTS ON CHANNEL 4
B-58 SEQUENCE B BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

		************* G R O U N D	D A T A ************					*********** A I R B O	R N E	D A T A	**********			TOTAL	CUMULATIVE	
FLT ID	PREFLT STRESS	NUM PEAKS	1.0 G STRESS	MEAN	VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	1.0 G STRESS	MEAN	VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	NUM PEAKS	NUM POINTS
4001	-8315.	6	-12223.	-11234.	.1277E+08	-15000.	-7762.	164	12691.	13211.	.2413E+08	2903.	24469.	170	170	190
4002	-8505.	6	-338.	430.	.1616E+08	-3631.	5759.	254	19392.	19701.	.2555E+08	9416.	30000.	260	430	462
4003	-8896.	2	-5659.	-3391.	.1801E+08	-6952.	-930.	32	16489.	16941.	.3061E+08	3430.	26084.	34	464	508
4004	-8741.	4	-1615.	-346.	.1249E+08	-4161.	2569.	214	13014.	13437.	.2633E+08	3176.	24879.	218	682	738
4005	-8766.	4	1915.	1207.	.6335E+08	-9444.	8216.	44	15317.	16149.	.2558E+08	7251.	24027.	48	730	798
4006	-8709.	82	-6839.	-6233.	.1656E+08	-15000.	9848.	188	15730.	16095.	.2303E+08	3934.	25637.	270	1000	1080
4007	-8462.	10	-681.	819.	.2126E+08	-4439.	6961.	126	12412.	12665.	.2377E+08	3287.	22587.	136	1136	1228
4008	-8792.	8	-9388.	-8275.	.2021E+08	-13196.	-2739.	100	15947.	16281.	.2758E+08	2337.	25488.	108	1244	1348
4009	-8723.	4	-6905.	-5512.	.3039E+08	-10604.	30.	32	18614.	19252.	.2549E+08	11670.	26568.	36	1280	1396
4010	-8833.	0	0.	0.	0.	0.	0.	20	13261.	13977.	.2523E+08	5839.	23164.	20	1300	1428
4011	-8758.	0	0.	0.	0.	0.	0.	120	17290.	17532.	.2577E+08	5931.	27553.	120	1420	1560
4012	-8663.	2	-11611.	-11404.	.1884E+08	-14473.	-8335.	110	17517.	18155.	.2786E+08	5210.	29532.	112	1532	1684
4013	-8760.	0	0.	0.	0.	0.	0.	1076	14479.	14964.	.2531E+08	115.	29903.	1076	2608	2772
4014	-8779.	2	-10635.	-9316.	.2899E+08	-13723.	-6109.	332	15507.	15810.	.2559E+08	5412.	28984.	334	2942	3118
4015	-8864.	4	-9084.	-8111.	.1809E+08	-12147.	-3395.	92	13548.	14198.	.2437E+08	3672.	26327.	96	3038	3226
4016	-8606.	6	-8621.	-7350.	.1759E+08	-12317.	-3897.	130	6364.	6663.	.2198E+08	-2213.	17086.	136	3174	3374
4017	-8735.	4	-4176.	-327.	.5461E+08	-7524.	9330.	56	13397.	13970.	.2553E+08	5333.	21304.	60	3234	3446
4018	-8747.	4	-11431.	-10256.	.3033E+08	-15000.	-4625.	42	14357.	14634.	.2338E+08	5528.	22547.	46	3280	3504
4019	-8754.	4	-11585.	-11409.	.1464E+08	-15000.	-7793.	80	17182.	18074.	.2551E+08	9334.	29824.	84	3364	3600
4020	-8555.	6	-1625.	-358.	.1475E+08	-4694.	3230.	862	11909.	12335.	.2543E+08	-4376.	26861.	868	4232	4480
4021	-8755.	12	-4339.	-3323.	.3251E+08	-15000.	5749.	68	16772.	16850.	.2645E+08	6997.	25293.	80	4312	4572
4022	-8784.	2	-5055.	-4743.	.3021E+08	-8630.	-856.	664	16134.	16495.	.2473E+08	2349.	30000.	666	4978	5250
4023	-8625.	8	-4615.	-3383.	.2079E+08	-10597.	1072.	258	19091.	19574.	.2271E+08	10792.	30000.	266	5244	5528
4024	-8520.	0	0.	0.	0.	0.	0.	472	9421.	9796.	.2472E+08	-954.	22142.	472	5716	6012
4025	-8726.	6	-5624.	-4367.	.2649E+08	-10900.	1036.	62	19607.	19948.	.2528E+08	12121.	28330.	68	5784	6092
4026	-8691.	6	-10649.	-10157.	.1984E+08	-14300.	-4861.	144	14013.	14546.	.2563E+08	2819.	24639.	150	5934	6254
4027	-8788.	2	-2049.	-2193.	.2437E+08	-5683.	1237.	238	15607.	15982.	.2293E+08	3845.	29019.	240	6174	6516
4028	-8689.	2	-9762.	-9365.	.2932E+08	-13197.	-5539.	86	15533.	17397.	.2547E+08	9711.	30000.	88	6262	6606
4029	-8824.	8	-5032.	-3325.	.1656E+08	-8830.	865.	114	12085.	12500.	.2579E+08	2224.	23061.	122	6384	6740
4030	-8799.	4	-12000.	-10375.	.1869E+08	-15000.	-6210.	130	15727.	15981.	.2595E+08	4761.	24520.	134	6518	6886
4031	-8747.	8	-6556.	-5711.	.2936E+08	-13089.	2116.	182	13542.	13735.	.2702E+08	3709.	27410.	190	6708	7088
4032	-8539.	4	-9926.	-9155.	.1614E+08	-13807.	-5046.	248	12510.	12961.	.2320E+08	3783.	22960.	252	6960	7352
4033	-8674.	4	-9636.	-9343.	.3281E+08	-15000.	-3726.	190	17085.	17554.	.2750E+08	6488.	30000.	194	7154	7558
4034	-8755.	6	-8277.	-7362.	.1174E+08	-11352.	-3665.	138	10866.	11114.	.2470E+08	2258.	19503.	144	7298	7714
4035	-8851.	4	-8891.	-8744.	.1196E+08	-12468.	-5733.	202	14725.	15277.	.2508E+08	5362.	27238.	206	7504	7932
4036	-8563.	8	-4630.	-3751.	.1360E+08	-7658.	870.	60	13390.	13605.	.1970E+08	6958.	21466.	68	7572	8012
4037	-8690.	2	-266.	1535.	.2891E+08	-2179.	5372.	162	13416.	13873.	.2602E+08	3844.	26764.	164	7736	8188
4038	-8803.	8	-10528.	-7370.	.9509E+08	-15000.	8967.	1132	13373.	13809.	.2509E+08	-1822.	28346.	1140	8876	9340
4039	-8701.	6	-2153.	711.	.7215E+08	-8878.	15416.	298	13151.	13706.	.2540E+08	3229.	24077.	304	9180	9656
4040	-8819.	10	-9544.	-9714.	.1706E+08	-15000.	-5159.	200	10554.	11026.	.2392E+08	-3769.	28515.	210	9390	9878
4041	-8845.	0	0.	0.	0.	0.	0.	80	9858.	10313.	.2545E+08	-2054.	20804.	80	9470	9970
4042	-8665.	18	-7603.	-7124.	.1752E+08	-13525.	-1585.	150	14169.	14466.	.2482E+08	3355.	24570.	168	9638	10150
4043	-8719.	2	-4987.	-5377.	.4231E+08	-9989.	-725.	26	12932.	13135.	.2561E+08	3032.	21269.	28	9666	10190
4044	-8675.	4	-5071.	-3736.	.2616E+08	-8743.	1430.	4	12915.	12419.	.2895E+08	6719.	17077.	8	9674	10210
4045	-8530.	2	-2870.	-2131.	.3226E+08	-6207.	1825.	100	16795.	17142.	.2535E+08	8423.	29006.	102	9776	10324
4046	-8706.	4	-7622.	-7037.	.1246E+08	-10235.	-3452.	172	14303.	14654.	.2287E+08	2631.	23611.	176	9952	10512
4047	-8756.	6	-1372.	-324.	.1288E+08	-4398.	3908.	102	15679.	15812.	.2586E+08	3756.	26221.	110	10062	10634
4048	-8611.	10	-5348.	-4352.	.1876E+08	-12725.	326.	28	11800.	11423.	.3077E+08	1105.	21628.	38	10100	10684
4049	-8727.	0	0.	0.	0.	0.	0.	232	17527.	17952.	.2240E+08	9544.	29317.	232	10332	10928
4050	-8519.	4	-9184.	-8994.	.2000E+08	-12885.	-4392.	242	15635.	15965.	.2589E+08	2239.	27485.	246	10578	11186

TABLE 68

SUMMARY OF DATA ON EACH CHANNEL
B-58 SEQUENCE B BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

					GROUND DATA						AIRBORNE DATA					
CHAN NO.	NUM REC	NO. OF PEAKS	NO. OF POINTS	NUM FLTS	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE
4	2578	206020	216500	822	29449.	-15000.	5852	-5738.	.3664E+08	.2374E+08	30000.	-15000.	200168	15054.	.3258E+08	.2543E+08
5	2573	206224	216116	823	28247.	-15000.	5320	-5881.	.3468E+08	.2209E+08	30000.	-15000.	200904	14877.	.3258E+08	.2551E+08
6	2574	206574	216202	801	26080.	-15000.	5212	-6051.	.3508E+08	.2357E+08	30000.	-15000.	201362	15154.	.3354E+08	.2539E+08
TOT	7725	618818	648818	2446	29449.	-15000.	16384	-5884.	.3552E+08	.2315E+08	30000.	-15000.	602434	15031.	.3291E+08	.2544E+08

TABLE 69

SIMULATION PROGRAM RUN ON 08/01/74 AT 18.49.55, SUMMARY OF FLIGHTS ON CHANNEL 4
B-58 SEQUENCE C BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

		************* GROUND		DATA ************				*********** AIRBORNE			DATA **********			TOTAL	CUMULATIVE	
FLT ID	PREFLT STRESS	NUM PEAKS	1.0 G STRESS	MEAN	VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	1.0 G STRESS	MEAN	VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	NUM PEAKS	NUM POINTS
4001	-8761.	0	0.	0.	0.	0.	0.	356	14017.	14223.	.2287E+08	5564.	24184.	356	356	376
4002	-3697.	0	0.	0.	0.	0.	0.	78	15041.	15272.	.1974E+08	7329.	23132.	78	434	466
4003	-8571.	0	0.	0.	0.	0.	0.	34	13871.	14650.	.2386E+08	6699.	22229.	34	468	512
4004	-8568.	0	0.	0.	0.	0.	0.	470	12778.	13137.	.2176E+08	3157.	26469.	470	938	994
4005	-8557.	0	0.	0.	0.	0.	0.	72	4171.	4177.	.2200E+08	-4791.	11458.	72	1010	1078
4006	-8304.	0	0.	0.	0.	0.	0.	138	14770.	15256.	.2142E+08	8329.	26752.	138	1148	1228
4007	-8876.	0	0.	0.	0.	0.	0.	448	18754.	19198.	.2329E+08	9286.	30000.	448	1596	1638
4008	-8673.	0	0.	0.	0.	0.	0.	118	12945.	13097.	.2610E+08	-3458.	23260.	118	1714	1818
4009	-8715.	0	0.	0.	0.	0.	0.	846	15505.	15931.	.2179E+08	5809.	29266.	846	2560	2676
4010	-8780.	0	0.	0.	0.	0.	0.	658	18885.	19224.	.2289E+08	10149.	30000.	658	3218	3346
4011	-8672.	0	0.	0.	0.	0.	0.	176	14839.	15019.	.2385E+08	6471.	30000.	176	3394	3534
4012	-8446.	0	0.	0.	0.	0.	0.	170	11591.	12009.	.2349E+08	1561.	23058.	170	3564	3716
4013	-8557.	0	0.	0.	0.	0.	0.	222	15807.	16085.	.2282E+08	6097.	29190.	222	3786	3950
4014	-8046.	0	0.	0.	0.	0.	0.	384	13978.	14413.	.2283E+08	4086.	25044.	384	4170	4346
4015	-8221.	0	0.	0.	0.	0.	0.	96	13654.	13608.	.2400E+08	2887.	22470.	96	4266	4454
4016	-8734.	0	0.	0.	0.	0.	0.	1282	20584.	20945.	.2231E+08	9470.	30000.	1282	5548	5748
4017	-8702.	0	0.	0.	0.	0.	0.	90	12462.	12757.	.2336E+08	4075.	23636.	90	5638	5850
4018	-8750.	0	0.	0.	0.	0.	0.	424	15343.	15698.	.2160E+08	5475.	25918.	424	6062	6286
4019	-8552.	0	0.	0.	0.	0.	0.	82	19141.	19486.	.2058E+08	11636.	27742.	82	6144	6380
4020	-8656.	0	0.	0.	0.	0.	0.	540	18686.	19114.	.2318E+08	8911.	30000.	540	6684	6932
4021	-8640.	0	0.	0.	0.	0.	0.	232	8643.	9038.	.2168E+08	368.	18305.	232	6916	7176
4022	-8643.	0	0.	0.	0.	0.	0.	112	15125.	15435.	.2248E+08	7552.	24379.	112	7028	7300
4023	-8803.	0	0.	0.	0.	0.	0.	384	12236.	12586.	.2256E+08	1379.	21788.	384	7412	7696
4024	-8584.	0	0.	0.	0.	0.	0.	46	9942.	10945.	.2425E+08	3975.	22179.	46	7458	7754
4025	-8459.	0	0.	0.	0.	0.	0.	48	13672.	13377.	.2034E+08	3963.	19587.	48	7506	7814
4026	-8515.	0	0.	0.	0.	0.	0.	12	15539.	15133.	.2011E+08	8739.	20193.	12	7518	7838
4027	-8597.	0	0.	0.	0.	0.	0.	652	13768.	14051.	.2181E+08	3203.	25385.	652	8170	8502
4028	-8807.	0	0.	0.	0.	0.	0.	64	12624.	13087.	.1999E+08	5930.	20624.	64	8234	8578
4029	-8761.	0	0.	0.	0.	0.	0.	338	15068.	15444.	.2337E+08	3772.	28522.	338	8572	8928
4030	-8410.	0	0.	0.	0.	0.	0.	782	7542.	7839.	.2182E+08	-2517.	19943.	782	9354	9722
4031	-8755.	0	0.	0.	0.	0.	0.	628	6232.	6460.	.2250E+08	-5485.	20350.	628	9982	10362
4032	-8747.	0	0.	0.	0.	0.	0.	282	17916.	18135.	.2171E+08	9072.	27390.	282	10264	10656
4033	-8942.	0	0.	0.	0.	0.	0.	18	15128.	15931.	.2261E+08	6905.	20973.	18	10282	10686
4034	-8065.	0	0.	0.	0.	0.	0.	104	12333.	12683.	.2123E+08	3774.	22175.	104	10386	10802
4035	-8664.	0	0.	0.	0.	0.	0.	268	12733.	13064.	.2206E+08	3785.	22912.	268	10654	11082
4036	-8498.	0	0.	0.	0.	0.	0.	140	11503.	11767.	.1939E+08	3603.	21561.	140	10794	11234
4037	-8650.	0	0.	0.	0.	0.	0.	18	12604.	12344.	.1936E+08	5353.	18248.	18	10812	11264
4038	-8566.	0	0.	0.	0.	0.	0.	44	11357.	11329.	.2048E+08	4515.	18298.	44	10856	11320
4039	-8751.	0	0.	0.	0.	0.	0.	260	8538.	8815.	.2123E+08	-975.	16990.	260	11116	11592
4040	-8642.	0	0.	0.	0.	0.	0.	124	13915.	14543.	.2297E+08	5035.	23350.	124	11240	11728
4041	-8736.	0	0.	0.	0.	0.	0.	82	9315.	9826.	.2085E+08	1705.	17938.	82	11322	11822
4042	-8053.	0	0.	0.	0.	0.	0.	194	15160.	15250.	.1954E+08	5961.	22912.	194	11516	12028
4043	-8537.	0	0.	0.	0.	0.	0.	112	15861.	15885.	.2329E+08	5549.	24435.	112	11628	12152
4044	-8720.	0	0.	0.	0.	0.	0.	282	13209.	13407.	.2242E+08	4583.	25665.	282	11910	12446
4045	-8759.	0	0.	0.	0.	0.	0.	38	10582.	11186.	.2192E+08	4084.	19559.	38	11948	12496
4046	-8703.	0	0.	0.	0.	0.	0.	36	11775.	12058.	.1807E+08	5140.	18265.	36	11984	12544
4047	-8594.	0	0.	0.	0.	0.	0.	182	4950.	5457.	.2442E+08	-4570.	17662.	182	12166	12738
4048	-8857.	0	0.	0.	0.	0.	0.	312	10211.	10405.	.2130E+08	867.	19652.	312	12478	13062
4049	-8522.	0	0.	0.	0.	0.	0.	14	10631.	10887.	.2338E+08	3510.	17298.	14	12492	13088
4050	-8880.	0	0.	0.	0.	0.	0.	878	8072.	8307.	.2231E+08	-1358.	19139.	878	13370	13978

TABLE 70

SUMMARY OF DATA ON EACH CHANNEL
B-58 SEQUENCE C BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

					GROUND DATA						AIRBORNE DATA					
CHAN NO.	NUM REC	NO. OF PEAKS	NO. OF POINTS	NUM FLTS	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE
4	2574	210158	216138	497	0.	0.	0	0.0.	0.		30000.	-14106.	210158	13766.	.3400E+08	.2248E+08
5	2585	211906	217142	435	0.	0.	0	0.0.	0.		30000.	-12353.	211906	13865.	.3294E+08	.2250E+08
6	2577	210674	216462	481	0.	0.	0	0.0.	0.		30000.	-15000.	210674	13983.	.3294E+08	.2256E+08
TOT	7737	632738	649742	1413	0.	0.	0	0.0.	0.		30000.	-15000.	632738	13872.	.3330E+08	.2251E+08

TABLE 71

SIMULATION PROGRAM RUN ON 08/01/74 AT 18.50.02, SUMMARY OF FLIGHTS ON CHANNEL 4
B-58 SEQUENCE D BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

		GROUND DATA						AIRBORNE DATA						TOTAL	CUMULATIVE	
FLT ID	PREFLT STRESS	NUM PEAKS	1.0 G STRESS	MEAN	VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	1.0 G STRESS	MEAN	VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	NUM PEAKS	NUM POINTS
4001	-8555.	0	0.	0.	0.	0.	0.	244	15711.	16216.	.2505E+08	5591.	27460.	244	244	264
4002	-8774.	0	0.	0.	0.	0.	0.	156	17632.	18107.	.2586E+08	3293.	30000.	156	400	432
4003	-8709.	0	0.	0.	0.	0.	0.	68	16209.	16594.	.2485E+08	5111.	27372.	68	468	512
4004	-8834.	0	0.	0.	0.	0.	0.	100	17140.	17127.	.2458E+08	6031.	28102.	100	568	624
4005	-8833.	0	0.	0.	0.	0.	0.	128	12646.	13303.	.2281E+08	4330.	24384.	128	696	764
4006	-8579.	0	0.	0.	0.	0.	0.	76	13109.	13583.	.2706E+08	2627.	24658.	76	772	852
4007	-8583.	0	0.	0.	0.	0.	0.	248	10864.	11011.	.2644E+08	-1900.	23561.	248	1020	1112
4008	-8765.	0	0.	0.	0.	0.	0.	448	13001.	13615.	.2581E+08	1173.	30000.	448	1468	1572
4009	-8844.	0	0.	0.	0.	0.	0.	102	12029.	12641.	.2509E+08	2825.	23018.	102	1570	1686
4010	-8625.	0	0.	0.	0.	0.	0.	172	12404.	12674.	.2675E+08	3477.	22166.	172	1742	1870
4011	-8785.	0	0.	0.	0.	0.	0.	106	16074.	15740.	.2488E+08	9372.	26562.	106	1848	1988
4012	-8756.	0	0.	0.	0.	0.	0.	294	15956.	16321.	.2661E+08	1074.	28502.	294	2142	2294
4013	-8719.	0	0.	0.	0.	0.	0.	162	15588.	15610.	.2526E+08	5781.	27068.	162	2304	2468
4014	-8849.	0	0.	0.	0.	0.	0.	88	14547.	14946.	.2368E+08	6409.	24737.	88	2392	2568
4015	-8558.	0	0.	0.	0.	0.	0.	106	16250.	16636.	.2468E+08	7259.	24552.	106	2498	2686
4016	-8677.	0	0.	0.	0.	0.	0.	566	10659.	11183.	.2443E+08	-1765.	23568.	566	3064	3264
4017	-8918.	0	0.	0.	0.	0.	0.	216	12615.	13195.	.2448E+08	1671.	26785.	216	3280	3492
4018	-8830.	0	0.	0.	0.	0.	0.	156	11925.	12452.	.2547E+08	2610.	25576.	156	3436	3660
4019	-8694.	0	0.	0.	0.	0.	0.	86	19734.	19889.	.2731E+08	9907.	29044.	86	3522	3758
4020	-8649.	0	0.	0.	0.	0.	0.	248	14105.	14535.	.2609E+08	1240.	28802.	248	3770	4018
4021	-8834.	0	0.	0.	0.	0.	0.	122	7611.	8158.	.2671E+08	-977.	21904.	122	3892	4152
4022	-8775.	0	0.	0.	0.	0.	0.	188	18972.	19527.	.2696E+08	4695.	30000.	188	4080	4352
4023	-8720.	0	0.	0.	0.	0.	0.	142	16325.	17165.	.2232E+08	6917.	25471.	142	4222	4506
4024	-8869.	0	0.	0.	0.	0.	0.	290	17053.	17431.	.2517E+08	5175.	30000.	290	4512	4808
4025	-8675.	0	0.	0.	0.	0.	0.	20	15386.	15723.	.1948E+08	9808.	21000.	20	4532	4840
4026	-8649.	0	0.	0.	0.	0.	0.	26	16518.	17350.	.2854E+08	11187.	28050.	26	4558	4878
4027	-8594.	0	0.	0.	0.	0.	0.	952	7431.	7787.	.2515E+08	-6251.	25956.	952	5510	5842
4028	-8754.	0	0.	0.	0.	0.	0.	80	15440.	15459.	.2739E+08	3536.	26813.	80	5590	5934
4029	-8548.	0	0.	0.	0.	0.	0.	196	14675.	15300.	.2644E+08	3262.	26616.	196	5786	6142
4030	-8812.	0	0.	0.	0.	0.	0.	28	14165.	14725.	.3367E+08	5970.	22912.	28	5814	6182
4031	-8670.	0	0.	0.	0.	0.	0.	76	21619.	22175.	.2341E+08	13747.	30000.	76	5890	6270
4032	-8705.	0	0.	0.	0.	0.	0.	108	15944.	16377.	.2994E+08	6449.	30000.	108	5998	6390
4033	-8527.	0	0.	0.	0.	0.	0.	340	21085.	21549.	.2543E+08	4333.	30000.	340	6338	6742
4034	-8794.	0	0.	0.	0.	0.	0.	36	13628.	13907.	.2247E+08	7923.	23513.	36	6374	6790
4035	-8785.	0	0.	0.	0.	0.	0.	512	15277.	15801.	.2610E+08	3737.	30000.	512	6886	7314
4036	-8849.	0	0.	0.	0.	0.	0.	88	19527.	19889.	.2471E+08	8060.	28420.	88	6974	7414
4037	-8578.	0	0.	0.	0.	0.	0.	172	8200.	8555.	.2497E+08	-2907.	21931.	172	7146	7598
4038	-8478.	0	0.	0.	0.	0.	0.	350	14337.	14709.	.2614E+08	4580.	30000.	350	7496	7950
4039	-8510.	0	0.	0.	0.	0.	0.	32	16545.	16745.	.2071E+08	10638.	24364.	32	7528	8004
4040	-8778.	0	0.	0.	0.	0.	0.	142	16104.	16964.	.2465E+08	5671.	29718.	142	7670	8158
4041	-8535.	0	0.	0.	0.	0.	0.	178	12263.	12622.	.2341E+08	4104.	23495.	178	7848	8348
4042	-8859.	0	0.	0.	0.	0.	0.	28	12876.	13315.	.2193E+08	5924.	21831.	28	7876	8388
4043	-8593.	0	0.	0.	0.	0.	0.	88	13876.	14441.	.2130E+08	7044.	22503.	88	7964	8488
4044	-8637.	0	0.	0.	0.	0.	0.	262	16103.	16628.	.2532E+08	4537.	25977.	262	8226	8762
4045	-8908.	0	0.	0.	0.	0.	0.	124	11902.	12249.	.2728E+08	1230.	23843.	124	8350	8898
4046	-8626.	0	0.	0.	0.	0.	0.	272	14333.	14721.	.2581E+08	3527.	29431.	272	8622	9182
4047	-8538.	0	0.	0.	0.	0.	0.	160	14569.	15175.	.2599E+08	6235.	30000.	160	8782	9354
4048	-8506.	0	0.	0.	0.	0.	0.	124	20135.	20674.	.2533E+08	12024.	30000.	124	8906	9490
4049	-8588.	0	0.	0.	0.	0.	0.	190	15999.	16366.	.2761E+08	5623.	27412.	190	9096	9692
4050	-8703.	0	0.	0.	0.	0.	0.	228	11886.	12428.	.2420E+08	2208.	24447.	228	9324	9932

TABLE 72

SUMMARY OF DATA ON EACH CHANNEL
B-58 SEQUENCE D BIVARIATE DISTRIBUTION OF PEAKS AND VALLEYS

					GROUND DATA						AIRBORNE DATA					
CHAN NO.	NUM REC	NO. OF PEAKS	NO. OF POINTS	NUM FLTS	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE
4	2572	205182	216010	901	0.	0.	0	0.0.	0.		30000.	-15000.	205182	15077.	.3262E+08	.2544E+08
5	2572	205060	216044	914	0.	0.	0	0.0.	0.		30000.	-15000.	205060	14691.	.3321E+08	.2552E+08
6	2577	206634	216454	817	0.	0.	0	0.0.	0.		30000.	-15000.	206634	15036.	.3218E+08	.2539E+08
TOT	7721	616876	648508	2632	0.	0.	0	0.0.	0.		30000.	-15000.	616876	14935.	.3270E+08	.2545E+08

TABLE 73

CUMULATIVE PROBABILITY FOR NEGATIVE GROUND PEAK DISTRIBUTION DATA
F-106 SEQUENCE F SEPARATE POSITIVE AND NEGATIVE STRAIN DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
-2000.	19	47.	1.00000000
-4000.	1	28.	.59574468
-10000.	1	27.	.57446809
-12000.	2	26.	.55319149
-14000.	12	24.	.51063830
-16000.	12	12.	.25531915
-18000.	0	0.	0.00000000

TABLE 74

CUMULATIVE PROBABILITY FOR POSITIVE GROUND PEAK DISTRIBUTION DATA
F-106 SEQUENCE F SEPARATE POSITIVE AND NEGATIVE STRAIN DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
3000.	22	47.	1.00000000
4000.	6	25.	.53191489
5000.	12	19.	.40425532
6000.	1	7.	.14893617
7000.	2	6.	.12765957
10000.	2	4.	.08510638
12000.	2	2.	.04255319
14000.	0	0.	0.00000000

TABLE 75

CUMULATIVE PROBABILITY FOR NEGATIVE AIRBORNE PEAK DISTRIBUTION DATA
F-106 SEQUENCE F SEPARATE POSITIVE AND NEGATIVE STRAIN DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
-1500.	8077	10793.	1.00000000
-3000.	1398	2716.	.25164458
-4000.	647	1318.	.12211619
-5000.	304	671.	.06216992
-6000.	157	367.	.03400352
-7000.	97	210.	.01945706
-8000.	42	113.	.01046975
-9000.	31	71.	.00657834
-10000.	24	40.	.00370611
-12000.	10	16.	.00148244
-14000.	3	6.	.00055592
-16000.	2	3.	.00027796
-20000.	1	1.	.00009265
-25000.	0	0.	0.00000000

TABLE 76

CUMULATIVE PROBABILITY FOR POSITIVE AIRBORNE PEAK DISTRIBUTION DATA
F-106 SEQUENCE F SEPARATE POSITIVE AND NEGATIVE STRAIN DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
3000.	3031	10793.	1.00000000
4000.	1943	7762.	.71916983
5000.	1112	5819.	.53914574
6000.	837	4707.	.43611600
7000.	629	3870.	.35855574
8000.	497	3241.	.30028722
9000.	325	2744.	.25423886
10000.	588	2419.	.22412675
12000.	411	1831.	.16964699
14000.	377	1420.	.13156676
16000.	287	1043.	.09663671
18000.	232	756.	.07004540
20000.	524	524.	.04854999
25000.	0	0.	0.00000000

TABLE 77

CUMULATIVE PROBABILITY FOR NUMBER OF GROUND PEAKS PER FLIGHT DATA
F-106 SEQUENCE F SEPARATE POSITIVE AND NEGATIVE STRAIN DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
0.	200	236.	1.00000000
1.	27	36.	.15254237
2.	2	9.	.03813559
3.	2	7.	.02966102
4.	1	5.	.02118644
7.	2	4.	.01694915
9.	1	2.	.00847458
11.	1	1.	.00423729
12.	0	0.	0.00000000

TABLE 78

CUMULATIVE PROBABILITY FOR NUMBER OF AIRBORNE PEAKS PER FLIGHT DATA
F-106 SEQUENCE F SEPARATE POSITIVE AND NEGATIVE STRAIN DISTRIBUTIONS

VALUE	FREQ DIST	CUM DIST	PROBABILITY
1.	40	236.	1.00000000
26.	80	196.	.83050847
51.	59	116.	.49152542
76.	33	57.	.24152542
101.	11	24.	.10169492
126.	5	13.	.05508475
151.	5	8.	.03389831
176.	1	3.	.01271186
201.	2	2.	.00847458
251.	0	0.	0.00000000

TABLE 79

SIMULATION PROGRAM RUN ON 07/09/74 AT 20.17.34, SUMMARY OF FLIGHTS ON CHANNEL 4
F-106 SEQUENCE F SEPARATE POSITIVE AND NEGATIVE STRAIN DISTRIBUTIONS

	GROUND DATA						AIRBORNE DATA								
FLT ID	NUM PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	NUM PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MINIMUM STRESS	MAXIMUM STRESS	TOTAL NUM PEAKS	CUM NUMBER PEAKS	CUM NUMBER POINTS
4001	0	0.	0.	0.	0.	0.	165	10962.	.4589E+08	.5270E+08	2181.	30000.	165	165	191
4002	0	0.	0.	0.	0.	0.	65	10939.	.4003E+08	.4679E+08	2571.	27030.	65	230	254
4003	1	11759.	0.	0.	11759.	11759.	49	10153.	.2640E+08	.2969E+08	3286.	28887.	50	280	312
4004	0	0.	0.	0.	0.	0.	66	10440.	.3618E+08	.4357E+08	2492.	25859.	66	346	385
4005	0	0.	0.	0.	0.	0.	27	11447.	.4472E+08	.5462E+08	2738.	27597.	27	373	421
4006	0	0.	0.	0.	0.	0.	88	10949.	.4673E+08	.5351E+08	-3836.	30000.	88	461	517
4007	0	0.	0.	0.	0.	0.	8	13615.	.1075E+09	.1331E+09	2948.	30000.	8	469	533
4008	1	14129.	0.	0.	14129.	14129.	64	9969.	.2701E+08	.2964E+08	1472.	26593.	65	534	606
4009	0	0.	0.	0.	0.	0.	43	10082.	.2945E+08	.3249E+08	773.	30000.	43	577	657
4010	0	0.	0.	0.	0.	0.	9	10229.	.3787E+08	.4180E+08	1721.	19451.	9	586	674
4011	0	0.	0.	0.	0.	0.	44	10466.	.4833E+08	.5286E+08	-27.	30000.	44	630	726
4012	0	0.	0.	0.	0.	0.	23	10194.	.3863E+08	.4211E+08	2903.	30000.	23	653	757
4013	7	7843.	.5202E+08	.5233E+08	-5759.	13473.	65	10258.	.3503E+08	.3873E+08	370.	30000.	72	725	837
4014	0	0.	0.	0.	0.	0.	73	11299.	.4431E+08	.5307E+08	2030.	28907.	73	798	918
4015	1	12771.	0.	0.	12771.	12771.	72	10395.	.2993E+08	.3412E+08	2999.	29468.	73	871	999
4016	0	0.	0.	0.	0.	0.	42	10935.	.4676E+08	.5355E+08	3342.	30000.	42	913	1049
4017	1	11862.	0.	0.	11862.	11862.	20	9337.	.1806E+08	.1936E+08	3202.	15573.	21	934	1074
4018	0	0.	0.	0.	0.	0.	34	9790.	.3239E+08	.3449E+08	1296.	30000.	34	968	1115
4019	0	0.	0.	0.	0.	0.	73	10994.	.5248E+08	.5951E+08	-3252.	30000.	73	1041	1197
4020	0	0.	0.	0.	0.	0.	1	14400.	0.	0.	14400.	14400.	1	1042	1202
4021	0	0.	0.	0.	0.	0.	43	10240.	.3204E+08	.3566E+08	-272.	23061.	43	1085	1253
4022	0	0.	0.	0.	0.	0.	173	10919.	.4543E+08	.5202E+08	-1994.	30000.	173	1258	1434
4023	1	11673.	0.	0.	11673.	11673.	53	10551.	.4041E+08	.4530E+08	2885.	30000.	54	1312	1495
4024	0	0.	0.	0.	0.	0.	21	10778.	.3327E+08	.3941E+08	4847.	24066.	21	1333	1525
4025	0	0.	0.	0.	0.	0.	93	10881.	.3979E+08	.4622E+08	2398.	29763.	93	1426	1626
4026	0	0.	0.	0.	0.	0.	11	12123.	.5364E+08	.6922E+08	5663.	26315.	11	1437	1645
4027	0	0.	0.	0.	0.	0.	90	10114.	.3506E+08	.3817E+08	1246.	30000.	90	1527	1743
4028	0	0.	0.	0.	0.	0.	65	10897.	.3821E+08	.4475E+08	2797.	30000.	65	1592	1816
4029	0	0.	0.	0.	0.	0.	97	11164.	.4456E+08	.5250E+08	1283.	30000.	97	1689	1921
4030	0	0.	0.	0.	0.	0.	28	10211.	.3296E+08	.3651E+08	4181.	29129.	28	1717	1957
4031	0	0.	0.	0.	0.	0.	47	10379.	.3228E+08	.3644E+08	1944.	23646.	47	1764	2012
4032	1	11893.	0.	0.	11893.	11893.	31	10012.	.3347E+08	.3629E+08	2916.	26037.	32	1796	2052
4033	0	0.	0.	0.	0.	0.	36	11426.	.5368E+08	.6334E+08	2376.	30000.	36	1832	2096
4034	0	0.	0.	0.	0.	0.	87	11248.	.5012E+08	.5855E+08	71.	30000.	87	1919	2191
4035	0	0.	0.	0.	0.	0.	219	10031.	.3231E+08	.3512E+08	-2586.	30000.	219	2138	2419
4036	0	0.	0.	0.	0.	0.	233	11219.	.5214E+08	.6035E+08	-3227.	30000.	233	2371	2659
4037	0	0.	0.	0.	0.	0.	59	10648.	.4069E+08	.4602E+08	3404.	30000.	59	2430	2726
4038	0	0.	0.	0.	0.	0.	23	11138.	.3834E+08	.4640E+08	5352.	30000.	23	2453	2757
4039	0	0.	0.	0.	0.	0.	156	10476.	.3163E+08	.3614E+08	1292.	30000.	156	2609	2921
4040	0	0.	0.	0.	0.	0.	33	10746.	.3933E+08	.4520E+08	3494.	26139.	33	2642	2962
4041	0	0.	0.	0.	0.	0.	62	10972.	.4818E+08	.5511E+08	1409.	30000.	62	2704	3032
4042	0	0.	0.	0.	0.	0.	48	10810.	.4407E+08	.5020E+08	580.	30000.	48	2752	3088
4043	0	0.	0.	0.	0.	0.	46	10251.	.3231E+08	.3597E+08	3741.	29539.	46	2798	3142
4044	0	0.	0.	0.	0.	0.	2	13369.	.1010E+09	.1512E+09	6262.	20477.	2	2800	3152
4045	0	0.	0.	0.	0.	0.	54	10640.	.4510E+08	.5040E+08	996.	30000.	54	2854	3214
4046	0	0.	0.	0.	0.	0.	141	10563.	.3326E+08	.3815E+08	2699.	30000.	141	2995	3363
4047	0	0.	0.	0.	0.	0.	28	10506.	.3350E+08	.3828E+08	2046.	30000.	28	3023	3399
4048	1	13832.	0.	0.	13832.	13832.	60	11096.	.4303E+08	.5064E+08	-1738.	25401.	61	3084	3468
4049	0	0.	0.	0.	0.	0.	11	11035.	.3534E+08	.4322E+08	4446.	21109.	11	3095	3487
4050	0	0.	0.	0.	0.	0.	166	10981.	.4345E+08	.5036E+08	319.	30000.	166	3261	3661

TABLE 80

SUMMARY OF DATA ON EACH CHANNEL

F-106 SEQUENCE F SEPARATE POSITIVE AND NEGATIVE STRAIN DISTRIBUTIONS

					************** G R O U N D			D A T A **************		************ A I R B O R N E			D A T A ***********		
CHAN NO.	NUM REC	NO. OF PEAKS	NO. OF POINTS	NUM FLTS	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE	MAX STRESS	MIN STRESS	NO. OF PEAKS	STRESS MEAN	STRESS VARIANCE	1.0 G VARIANCE
4	2572	192266	216014	3263	22341.	-9629.	1101	8887.	.6735E+08	.6762E+08	30000.	-15000.	189165	10734.	.4023E+08	.4586E+08
5	2573	189455	216084	3380	22318.	-9603.	1171	9137.	.6065E+08	.6126E+08	30000.	-14903.	188285	10726.	.4026E+08	.4586E+08
6	2572	193817	216009	3323	22349.	-9635.	1158	8944.	.6464E+08	.6498E+08	30000.	-15000.	188659	10737.	.4043E+08	.4607E+08
TOT	7717	559539	648107	9966	22349.	-9635.	3430	8992.	.6412E+08	.6452E+08	30000.	-15000.	566109	10732.	.4030E+08	.4593E+08

TABLE 81

TEST RESULTS FOR B-58 DATA SET
ORIGINAL STRAIN GAGE DATA

Specimen Number	Sequence	Failure Cycles	Failure Flights	Average No. Cycles/Flights
13	A	564,937	1956	
14	A	782,822	2723	
15	A	767,827	2667	
16	A	559,334	1939	
17	A	1,166,998	3710	
18	A	638,366	2221	
Average		746,714	2536	294
19	C	1,139,028	4047	
21	C	1,036,393	3679	
22	C	976,482	3466	
23	C	864,875	3048	
24	C	1,153,512	4096	
25	C	1,104,352	3850	
Average		879,107	3697	237
26	B	367,520	2421	
29	B	398,787	2598	
30	B	344,768	2260	
31	B	389,847	2554	
32	B	388,495	2542	
33	B	388,490	2542	
Average		379,651	2486	152
34	D	369,141	2511	
35	D	401,207	2717	
36	D	340,371	2338	
37	D	422,166	2887	
38	D	478,542	3211	
39	D	556,902	3786	
Average		428,054	2908	147

Sequence A has a $\overline{\sigma}^2$ value of 19.8 ksi^2.
Sequence C same flight cycles as Spectrum A but ground (taxi) cycles removed. Ground stress set equal to pre-flight refueling stress.
Sequence B has a $\overline{\sigma}^2$ value of 24.9 ksi^2.
Sequence D same flight cycles as Spectrum B but ground (taxi) cycles removed. Ground stress set equal to pre-flight refueling stress.

TABLE 82

TEST RESULTS FOR F-106 DATA SET
ORIGINAL STRAIN GAGE DATA

Specimen Number	Sequence	Failure Cycles	Failure Flights	Average No. Cycles/Flight
40	E	2,180,569	31,882	
41	E	2,855,495	41,743	
42	E	2,430,610	35,052	
43	E	2,850,984	41,703	
44	E	3,337,040	48,777	
45	E	2,161,772	31,593	
Average		2,636,078	38,458	68.5
46	F	461,041	5,472	
47	F	465,350	5,530	
48	F	323,386	3,843	
49	F	704,095	8,371	
50	F	987,347	11,781	
51	F	682,153	8,092	
56	F	743,264	8,933	
57	F	631,791	7,480	
Average		624,803	7,441	83

Sequence E has a $\bar{\sigma}^2$ value of 18.23×10^6
Sequence F has a $\bar{\sigma}^2$ value of 41.90×10^6

$\bar{\sigma}^2$ is a weighted average which was calculated by the following equation

$$\bar{\sigma}^2_{\text{weighted}} = \frac{\sum_{i=1}^{N} \bar{\sigma}_i^2 \, n_i}{\sum_{i=1}^{N} n_i}$$

where

$\bar{\sigma}_i^2$ = variance of flight i about the mean of the absolute stress peaks and valleys of flight i
n_i = number of stress reversals in flight i
N = number of flights in data set

TABLE 83

TEST RESULTS FOR SIMULATED B-58 SEQUENCE A

Specimen Number	Sequence	Failure Cycles	Failure Flights	Average No. Cycles/Flight
75	A	414,810	1712	
76	Folded	270,010	1127	
77	See	320,866	1335	
78	Paragraph	286,890	1197	
79	5.1.1	302,445	1262	
Average		319,004	1326	240
107	A	471,162	2084	
108	Bivariate	502,945	2219	
109	Peak & Valley	540,842	2417	
110	See	457,182	2018	
111	Paragraph	497,683	2123	
112	5.1.2	532,120	2325	
Average		500,322	2198	227

TABLE 84

TEST RESULTS FOR SIMULATED F-106 SEQUENCE E

Specimen Number	Sequence	Failure Cycles	Failure Flights	Average No. Cycles/Flight
	E			
80	Bivariate	536,792	18,931	
81	Mean &	676,273	23,951	
82	Alternating	595,466	21,116	
83	See	442,538	14,616	
84	Paragraph	683,415	24,187	
85	5.2.1	716,849	25,312	
Average		608,555	21,352	28.5
	E			
86	Separate	1,065,420	46,169	
87	Peak &	1,410,488	60,982	
88	Valleys	799,311	34,667	
89	See	886,290	38,339	
91	Paragraph	661,348	28,593	
92	5.2.2	1,137,803	49,204	
Average		993,443	42,992	23.1
	E			
93	Limited	785,727	35,575	
94	Separate	1,184,699	53,586	
95	Peak &	923,274	41,752	
96	Valley	786,942	35,630	
97	See	837,690	37,852	
98	Paragraph	1,052,178	47,619	
	5.2.3			
Average		928,418	42,002	22.1

TABLE 85

TEST RESULTS FOR SIMULATED B-58 SEQUENCE B, C, AND D

Specimen Number	Sequence	Failure Cycles	Failure Flights	Average No. Cycles/Flight
125	C	556,685	2487	
126	Bivariate	910,042	4071	
127	Peak and	888,343	3981	
128	Valley	620,371	2770	
130	See	581,368	2607	
131	Paragraphs 5.1.2 and 5.4.1	505,582	2268	
Average		677,065	3031	223
132	B	264,329	2161	
133	Bivariate	315,276	2547	
134	Peak and	360,874	2959	
135	Valley	243,023	1998	
136	See	282,724	2295	
137	Paragraphs 5.1.2 and 5.4.1	269,424	2201	
Average		289,275	2360	122
140	D	414,844	3564	
141	Bivariate	499,617	4300	
142	Peak and	385,938	3315	
143	Valley See Paragraghs 5.1.2 and 5.4.1	397,527	3413	
Average		424,481	3648	116

TABLE 86

TEST RESULTS FOR SIMULATED F-106
SEQUENCE F

Specimen Number	Sequence	Failure Cycles	Failure Flights	Average No. Cycles/Flight
113	F	192,248	6721	
114	Separate	209,853	7344	
115	Peak & Valleys	308,147	10736	
116	See	175,749	6175	
117	Paragraphs	158,982	5557	
118	5.2.2 and 5.4.2	172,224	6043	
	Average	202,867	7096	28.6

TABLE 87

TEST DATA SUMMARY

Method	Specimens	Cycles/ Flight	Tape, Channels	Average Flights to Failure
	B-58 DATA SET			
B58 Seq. A Original Data	13-18	294	21, 1-3	2,536
B58 Seq. A Folded Dist. Simulation	75-79	240	25, 1-3	1,326
B58 Seq. A Bivariate P&V Simulation	107-112	227	31, 12-14	2,198
B58 Seq. C Original Data	19,21-25	237	21,4,5	3,697
B58 Seq. C Bivariate P&V Simulation	125-128, 130, 131	223	33, 1-3	3,031
B58 Seq. B Original Data	26,29-33	152	21,8,9,11	2,486
B58 Seq. B Bivariate P&V Simulation	132-137	122	33,4-6	2,360
B58 Seq. D Original Data	34-39	147	21, 12-14	2,908
B58 Seq. D Bivariate P&V Simulation	140-143	116	33,8,9,11	3,648
	F106 DATA SET			
F106 Seq. E Original Data	40-45	68.5	19,1-3	38,458
F106 Seq. E Bivariate Mean & Alt Sim.	80-85	28.5	26,1-3	21,352
F106 Seq. E Separate P&V Simulation	86-89,91,92	23.1	26,4-6	42,992
F106 Seq. E Limited Separate P&V Sim.	93-98	22.1	26,8,9,11	42,002
F106 Seq. F Original Data	46-51,56,57	83	19,8,9,11	7,441
F106 Seq. F Separate P&V Simulation	113-118	28.6	31,1-3	7,096

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